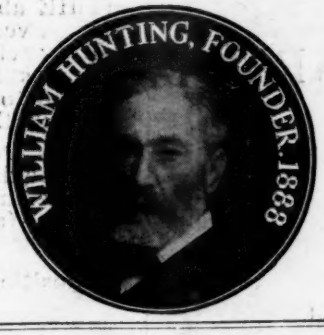
SEPTEMBER 22ND, 1934.

The Veterinary Record



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FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 38 SEPTEMBER 22, 1934. VOL. XIV.

Papers Presented to Congress

No. 6.—DISTEMPER OF THE CAT*

T. DALLING, M.R.C.V.S.

WELLCOME RESEARCH LABORATORIES, BECKENHAM

At the outset, I desire to point out that our work on this subject is very incomplete, but that we hope to make a further contribution when this paper is discussed at the Congress.

Our interest in feline distemper arose from the demand of veterinary surgeons for some curative product with which to treat cats brought to them suffering from feline distemper, or for some prophylactic with which cats could be treated prior to their being exhibited at shows, etc. Having had a considerable amount of experience in the investigation into canine distemper and the preparation of prophylactic and curative products for that disease, we felt that we might be able to profit by these experiences and apply some of our findings to the subject of feline distemper. We realised the necessity of breeding cats in specially isolated quarters so that highly susceptible animals would be available for experimental work. We, therefore, established a cat breeding compound on practically the same lines as those used for breeding our susceptible puppies.

The first part of our investigation was to ascertain from the literature and by consulting members of the veterinary profession, as well as cat breeders, how much was known on the subject of feline distemper. Within recent times, two important papers on this disease have been published. Hindle and Findlay (1932), described the investigations they carried out and came to the conclusion that the primary cause of cat distemper is a filterable virus and that the various bacteria which they isolated from the tissues of affected cats played no ætiological rôle. They further showed that large doses of immune serum protect kittens, at least temporarily, against inoculations of virus.

URBAIN (1933) investigated a disease of cats to which he gave the name "Infectious Gastro-enteritis of Cats." He concludes that the condition is caused primarily by a filterable virus which he found in the various organs and secretions of affected cats. Further, he was able to induce active immunity in cats by the injection of vaccine composed of formolised spleen from affected cats.

*Presented to the Veterinary Medicine and Surgery Section, N.V.M.A. Congress, Edinburgh, August 3rd, 1934.

TABLE 1.

Case	*History*	*Post-mortem Findings*	*Bacteriology*
1.	Sudden illness—death in a few hours.	Congestion of small intestine. Other organs normal.	All cultures sterile.
2.	Indefinite symptoms for 24 hours, then died suddenly.	Slight congestion of small intestine Other organs normal.	Lactose fermenter from lung only.
3.	Ill for few hours only.	All organs appeared normal.	All cultures sterile.
4.	Indefinite for some days.	Congestion of one lung.	Lactose fermenter from lung only.
5.	Ill for about 30 hours. Vomition, inappetence, salivation.	Definite pneumonia, tracheitis, laryngitis. Petechial hæmorrhages throughout all tissues.	Hæmolytic streptococcus from lungs
6.	No history.	All organs appeared normal.	All cultures sterile.
7.	Illness of few hours' duration followed by sudden death.	Marked enteritis.	Lactose fermenters from most tissues.
8.	Similar to 7.	Marked enteritis.	All cultures sterile.
9.	Ill for some days, profuse exudate from eyes and nose.	All organs appeared normal.	All cultures sterile.
10.	Cat ill for about a week, exudate from eyes and nose.	Definite pneumonia in both lungs.	Streptococcus from lungs.
11.	Ill for 24 hours, then destroyed by chloroform.	Pneumonia, petechial hæmorrhages in small intestine. Œdematous condition of mesenteric lymphatic glands.	Lactose fermenters in all tissues.
12.	Ill for 24 hours—died suddenly.	Pleural effusion, congestion of small intestine, œdematous condition of mesenteric lymphatic glands.	Lactose fermenters. streptococci and staphylococci from most tissues.

In discussions we had with veterinary surgeons and cat breeders we soon found that observers are not agreed that feline distemper and infectious gastro-enteritis are one and the same disease, but, rather, that they are two entirely different conditions, in all probability set up by different causes. The various observers (*e.g*, Kirk [1933]) base their opinions entirely on clinical observations. We feel that, from the large number of observations we have made in connection with the variation in the symptoms shown by dogs affected with true canine virus distemper, only slight stress can be laid on opinions based entirely on clinical grounds, and though our observations and experimental findings up to date point to there being two diseases —true infectious enteritis and another disease which is commonly referred to as feline distemper or feline influenza—we desire much more experimental evidence, especially on immunological lines, before we can be dogmatic on the subject.

Our investigations up to date have been almost entirely confined to the disease described by Hindle and Findlay, and to which we shall refer as infectious feline enteritis.

Material Investigated

During the short time we have been engaged in this work we have had the carcases of 12 cats sent to us for investigation. The table on the preceding page gives a short description of the history, *post-mortem* findings and bacteriological results.

All these cases were described to us as typical of feline distemper. Even in this small number of cases the variety of macroscopic lesions seen on *post-mortem* examination is noteworthy. Congestion of the small intestine and enteritis was found in six of the twelve cases, while lesions in respiratory organs were observed in five. In two cases, lesions were found in both the small intestine and in the thoracic cavity, while in one cat no obvious lesions were noted.

The bacteriological findings were by no means constant, and in five cases the various tissues examined yielded no cultures. The findings are in keeping with those of Hindle and Findlay, and would indicate that little importance can be attached to the bacterial flora, at least as the primary cause of feline distemper.

Experimental Transmission

Facilities have not yet permitted us to carry out transmission experiments in which we could use tissues from all cases examined. We have therefore confined our efforts to experiments in which (1) a mixture of tissues from cases 1 and 7 and (2) tissues from case 12 were used. Our procedure has been to remove the spleen and mesenteric lymphatic glands from the carcase under sterile conditions and to store them in a frozen condition till used for transmission work. Immediately before use the tissues were emulsified in normal saline solution to make a 5 per cent. emulsion.

Group A.—Transmission experiments of this group were carried out on six healthy kittens, isolated in special cages and kept under close observation during the course of the experiments.

(1) *One kitten* (*No.* 3) was injected subcutaneously with 1 c.c. of spleen and gland emulsion. Within 24 hours the temperature rose to 105·2° F. and the kitten had ceased feeding. It was found dead the next day. *Post-mortem* examination showed marked enteritis with an excess of thickish peritoneal fluid. Other organs appeared normal. From the various tissues a hæmolytic streptococcus was isolated in pure culture.

(2) *One kitten* (*No.* 4) was sprayed intranasally with the same tissue emulsion. The temperature rose to 103·8° F. on the second day, and thereafter varied considerably till death, which took place on the seventh day following infection. *Post-mortem* examination showed slight congestion of the small intestine without any excess of peritoneal fluid. The mesenteric lymphatic glands were enlarged, hæmorrhagic and œdematous. Both hock joints were swollen and contained purulent material. Other organs appeared normal. From the various tissues a hæmolytic streptococcus and a lactose fermenter were isolated.

(3) *Two kittens* (*Nos.* 7 *and* 9) were kept in contact with Nos. 1 and 2 from the beginning of the experiment. No. 7 showed a rise in temperature to 105° F. on the fifth day. It developed an ocular discharge and became decidedly ill on the sixth day. Death took place on the tenth day. *Post-mortem* examination showed definite enteritis and an excess of peritoneal fluid purulent in character. Hæmolytic streptococci and lactose fermenters were isolated from the various tissues.

No. 9 showed a temperature of 105·6° F. within 48 hours and died on the fourth day. *Post-mortem* examination showed conditions similar to No. 7. A hæmolytic streptococcus was isolated from the various tissues.

(4) *Two kittens* (*Nos.* 13 *and* 17) were placed in contact with kittens Nos. 4, 7 and 9. No. 13 registered a temperature of 106·2° F. within 48 hours and died on the third day. On *post-mortem* examination a congestion and mild inflammation of the small intestine was found with excess of peritoneal fluid, cloudy in character. The mesenteric lymphatic glands were œdematous. Other organs appeared normal. Hæmolytic streptococci and coliform organisms were isolated from the various tissues.

No. 17 registered a temperature of 104° F. on the second day. By the fourth day it was 105·6° F. Death occurred on the fourth day. *Post-mortem* findings were as above, together with small areas of inflammation in the stomach. Pure cultures of hæmolytic streptococci were isolated from the various tissues.

From the above it will be seen that we were able to transmit to healthy kittens a disease characterised by congestion of the small intestine or enteritis, and that, further, artificially-

infected kittens transmitted a similar type of disease to healthy kittens by contact.

Group B.—In this group of experiments tissues from one affected cat (No. 12) only were used.

(1) *One kitten* (*No.* 1) was injected subcutaneously with 1 c.c. spleen emulsion. The temperature rose gradually for five days, when death occurred. *Post-mortem* examination showed enteritis, some peritonitis and an œdematous condition of the mesenteric lymphatic glands. Hæmolytic streptococci and coliform organisms were isolated.

(2) *One kitten* (*No.* 2) was sprayed intranasally with the above emulsion. Within 24 hours the temperature rose to 104·6° F. By the second day it was 106·6° F. Death occurred on the third day. The same *post-mortem* appearances as above were found and the bacteriology was also similar.

(3) *Two kittens* (*Nos.* 5 *and* 6) were placed in contact with Nos. 1 and 2. In both cases the temperature rose to over 104° F. by the second day. In No. 5 it fell rapidly to 100·6° F. the same evening, and we destroyed the cat when *in extremis*. In No. 6 the temperature reached 107° F. on the third day. Death took place on the fourth day. *Post-mortem* examination showed marked enteritis and peritonitis in both with enlargement of the mesenteric lymphatic glands. Hæmolytic streptococci and coliform organisms were isolated.

(4) *Two kittens* (*Nos.* 11 *and* 15) were placed in contact with Nos. 5 and 6. Both showed the typical rise in temperature on the second day—No. 11, 105·6° F.; No. 15, 106·6° F. No. 11 died in six days and No. 15 in five days. Both cats were decidedly ill for two days before death. *Post-mortem* examinations were typical (enteritis and enlarged, œdematous mesenteric lymphatic glands, etc.). Bacteriological examination yielded cultures as above.

(5) *Two kittens* (*Nos.* 8 *and* 10) were placed in contact with the carcase of the original affected cat (No. 12). Both developed the typical disease as above. Temperatures rose by the second day to 105·8 and 106·6° F., and death occurred on the fourth and third days respectively. *Post-mortem* examinations were typical as above and the same bacteriological findings were obtained.

(6) *Two kittens* (*Nos.* 14 *and* 16) were placed in contact with the carcase of No. 10. These kittens behaved in the typical manner, developing high temperatures by the second day (up to 105·4° F.). No. 14 died on the seventh day. No. 16 was killed early for observational purposes. The *post-mortem* findings were typical and the same bacteriological findings as above were obtained.

Thus in group B also we were able to transmit a disease to healthy kittens with regularity and contact with artificially-infected cats caused successful transmission to healthy kittens.

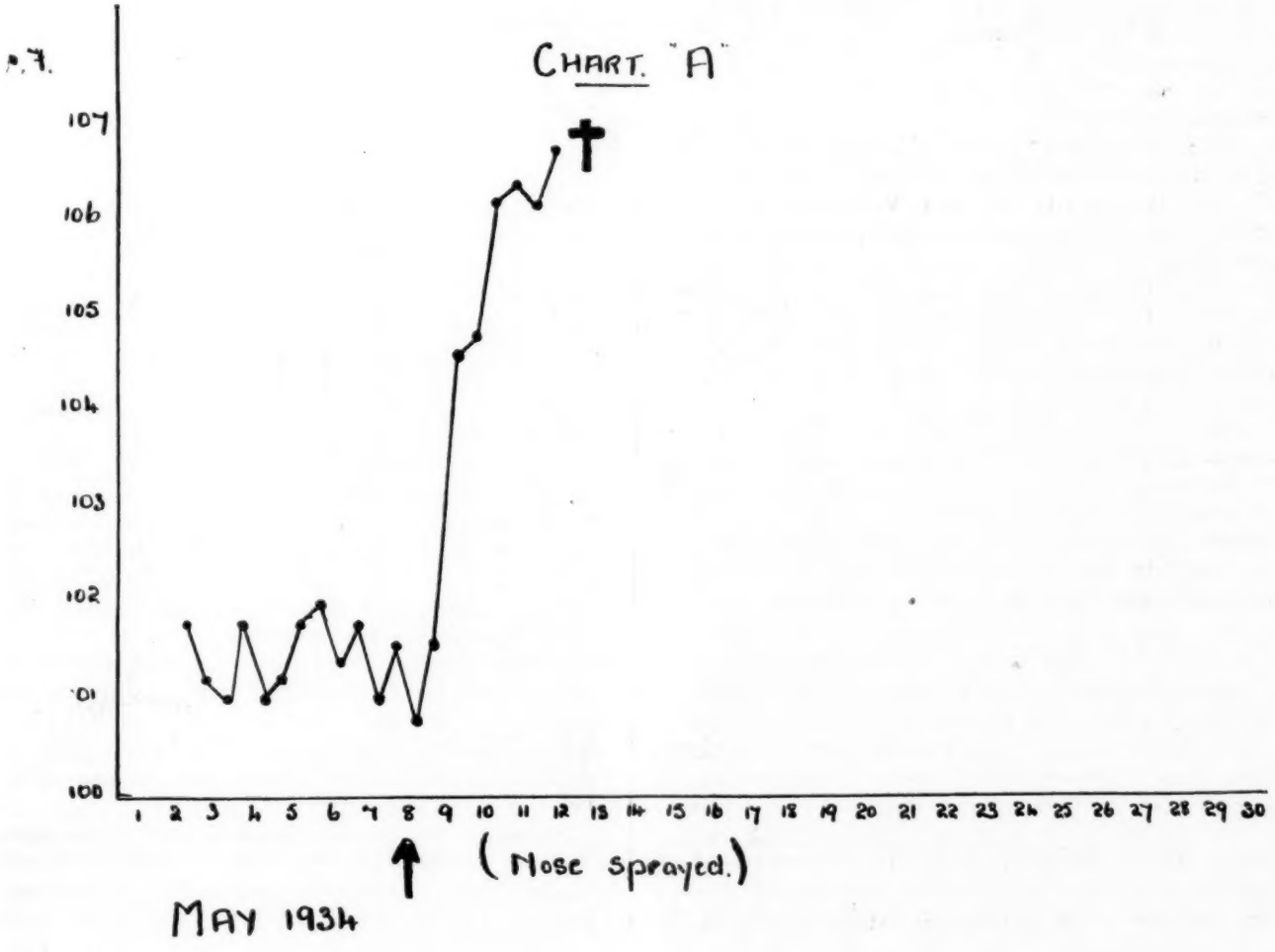

CHART. B.

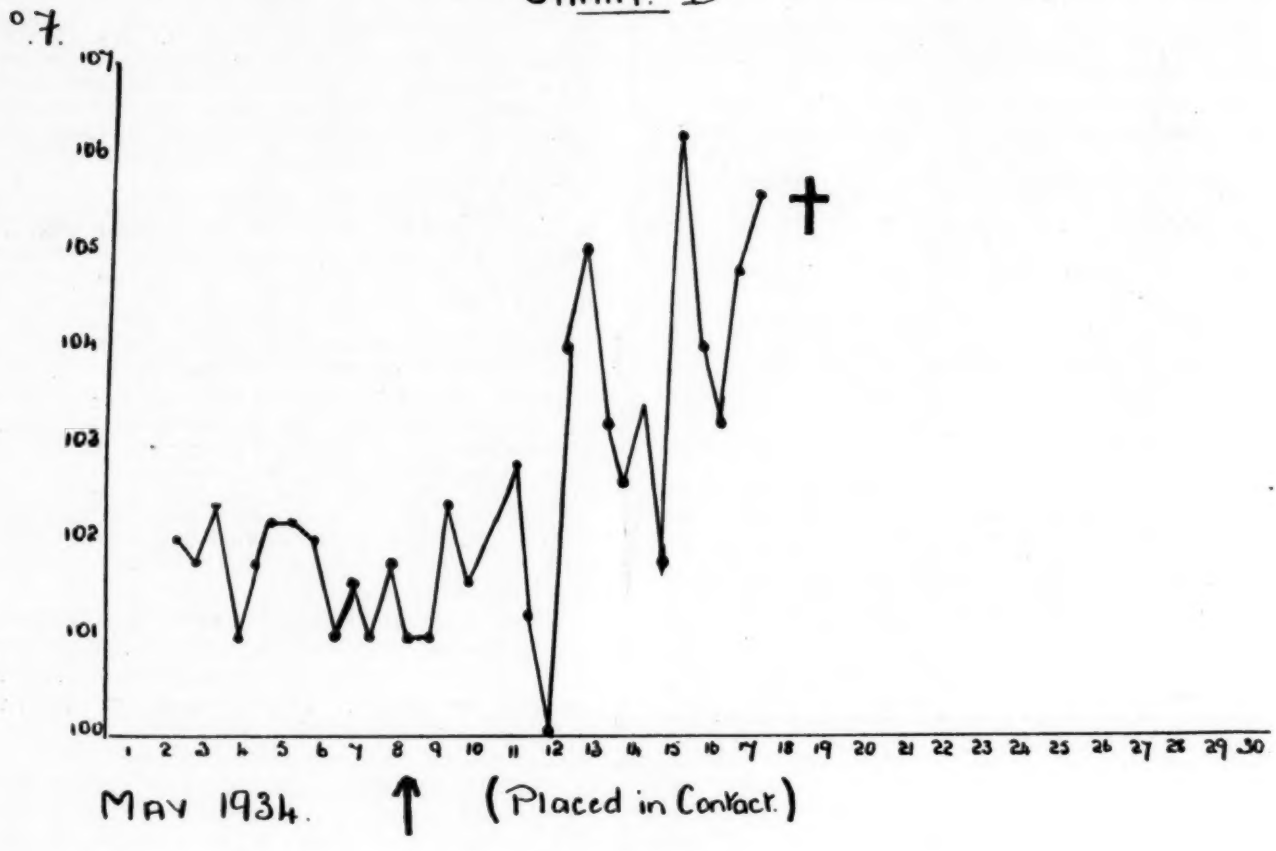

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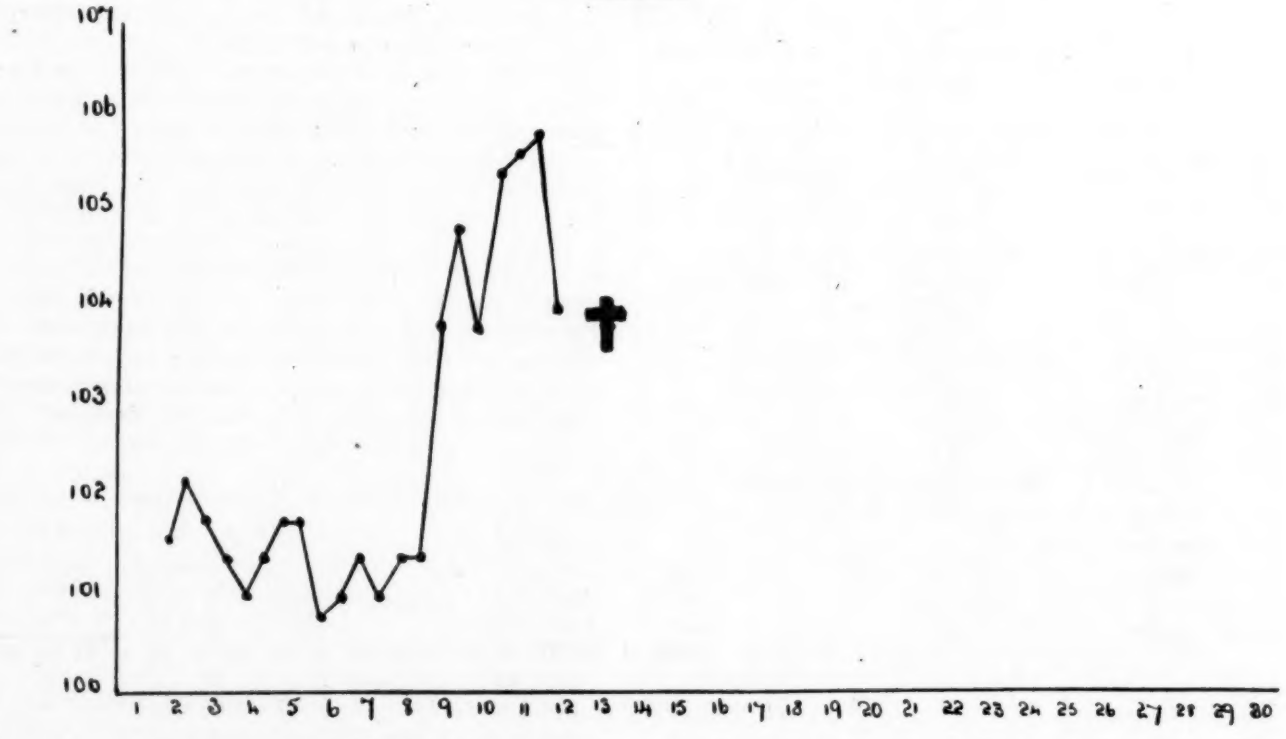
CHART. C.



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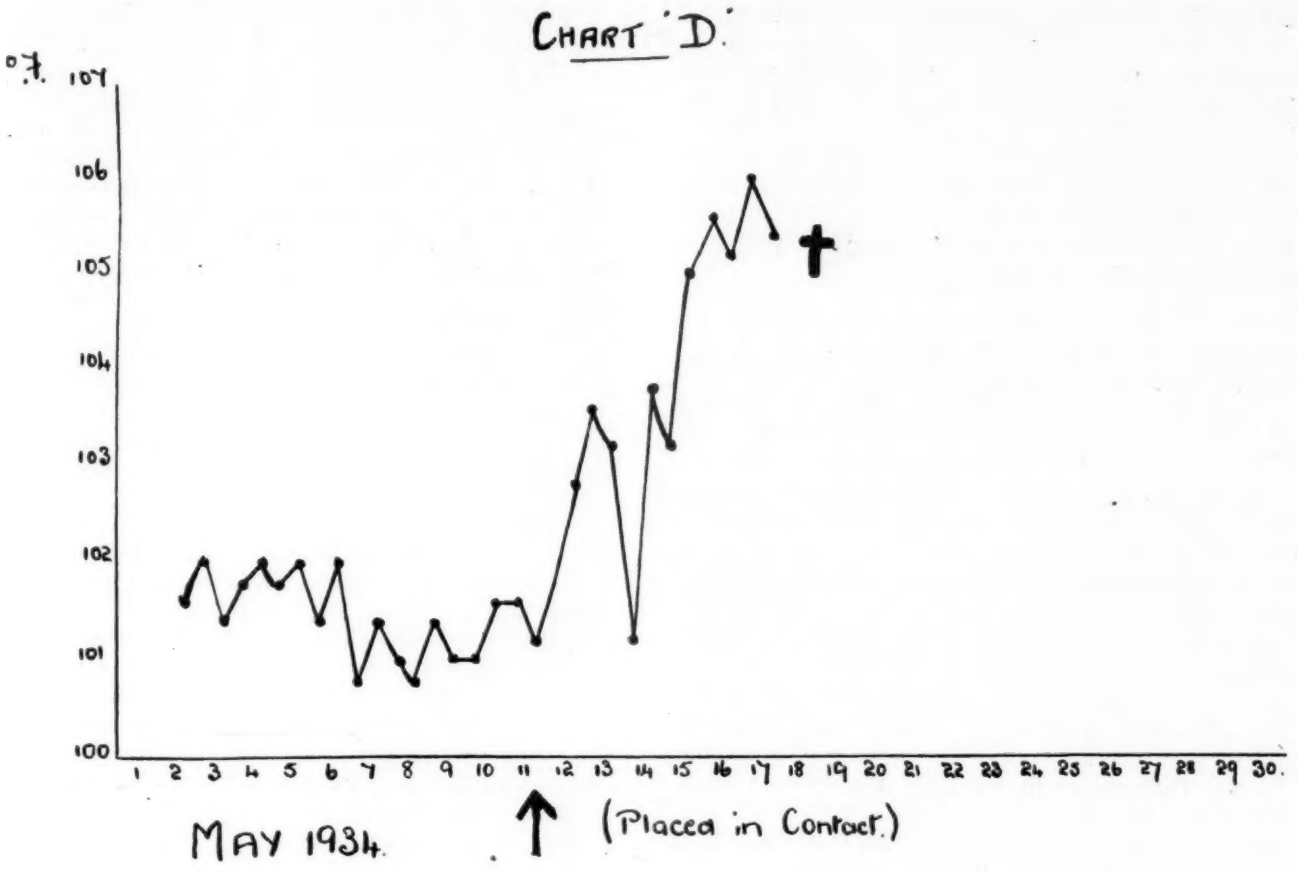


From the above group of experiments (A and B), in which the tissues from cats sent to us as typical specimens of feline distemper were used, we were able to set up a disease showing definite and constant characters. These consisted in (1) a definite temperature reaction usually by the second day (see temperature charts a, b, c and d), great depression, marked constipation with the evacuation of mucus per rectum and death in two to ten days following infection (average time four days); (2) a condition of the small intestine varying from a mild congestion of the mucous membrane to intense enteritis and an œdematous condition of the mesenteric lymphatic glands. (In some cases gastritis was found and in some peritonitis of a purulent character.)

The foregoing represents the work we have done up to date. Much more work is in progress, and we hope results will be available when this paper is discussed in August.

We might indicate here that we have some evidence that this infectious enteritis of cats is an entity, and that in all probability at least one other disease of an infectious nature exists with symptoms very different from those we have described and in which catarrh of the respiratory tract is predominant. The very few experiments we have been able to carry out indicate that cats which have recovered from the respiratory catarrhal condition are still susceptible to infectious enteritis.

The work we have in hand embraces examinations for the presence of filterable viruses in these two conditions, further experiments in the differentiating of the conditions referred to as "feline distemper" and investigations into methods of the production of immunity.

SUMMARY

The paper deals with investigations into a contagious disease of cats characterised by illness of short duration in which no characteristic clinical symptoms are shown and in which the most constant *post-mortem* findings are enlargement and congestion of the abdominal lymph glands and some degree of congestion of the small intestine. The disease can be readily transmitted to young cats by the subcutaneous injection of emulsions of spleen and abdominal lymph glands of affected cats, or by intranasal instillation of such material, and by contact. Artificially infected cats transmit the disease with great regularity. Direct contact with an infected animal is not necessary for the transmission of the disease; infection is readily

spread by fomites. Evidence is produced to show that, in all probability, the disease is caused by a filterable virus and that the various micro-organisms found in association may determine the course of the affection.

A further account of the nature of the infecting agent and a description of experimental work in connection with the production of artificial immunity will be given when the paper is discussed at the Congress.

References

Hindle, E., and Findlay, G. M. 1932. *Journ. Comp. Path. and Therap.* XLV. 11.

Kirk, H. 1933. *Vet. Record,* XIII. 8. 147.

Urbain, A. 1933. Ann. l'Inst. Pasteur. LI. 202.

At the commencement of this, the final session of Congress, N.V.M.A., devoted to the consideration of scientific papers, there was but a small company present (though the number of members grew later), in the Hall of the Royal (Dick) Veterinary College on the morning of Friday, August 3rd, 1934, when Major A. Spreull (Dundee) presided over the Veterinary Medicine and Surgery Section at which the foregoing paper was considered.

The Chairman, in opening the proceedings, expressed his surprise at such a meagre attendance. It was disappointing, because they had an excellent paper by a very well-known man. They had been pleased to watch Major Dalling going from success to success in the various problems which he had tackled. (Applause.)

INTRODUCTION—AMPLIFICATION OF THE PAPER

Major Dalling, amplifying his paper, observed that when he had first been invited to write a paper on " Distemper of the Cat " he hesitated for a while because, although they were working upon that disease and had been doing so for perhaps the last twelve months, he felt that the work was not sufficiently advanced to merit the writing of a paper, but on second thoughts it occurred to him that it would be only fair to accept the invitation and embody in the paper the results of the work that had been finished, and ask permission to amplify the paper at that meeting and give a few extra results that had come through since the paper had been written.

Proceeding, Major Dalling said :—

We have now carried out further observations and the results of some of our experiments are now available.

The work really embraces three points :—

(*a*) The establishing of the presence of a filterable virus in the tissues of affected cats and its significance in the causation of the disease referred to as " infectious enteritis."

(*b*) The differentiating of the conditions referred to as " feline distemper."

(*c*) Investigations into the production of immunity, especially against this so-called infectious enteritis of the cat.

A.—That a filterable virus is present in the spleen of cats suffering from clinical infectious enteritis and that the introduction of this virus to a susceptible cat will set up the disease, has been shown by our experiments. Spleens emulsified in saline and filtered through an ordinary Berkefeld filter, when injected into susceptible kittens give rise to the train of symptoms already described, though we have not succeeded in causing disease of a very acute nature. The course of the disease is much longer and recovery is the rule rather than death. If, however, to this filtrate be added an emulsion of the predominating micro-organism found in naturally occurring cases—a hæmolytic streptococcus—the disease assumes a very acute course, resulting in death in about 48 hours and at *post-mortem* examination the typical lesions are found. We have not yet come to a definite conclusion regarding the exact influence of the streptococcus or other micro-organisms, but we have definitely established that a filtrate of spleens from acutely infected cats, though causing when injected a train of symptoms typical of feline enteritis in its milder form, does, when the streptococcus is added, give rise to the acute, typical disease. There are two possibilities in this connection; the virus may be the true cause of the disease as is found in canine distemper and the inclusion of the streptococcus may accentuate the condition. This, of course, is well-known in connection with canine distemper. On the other hand, there is still a possibility that it is essential that both virus and a micro-organism, *e.g.,* a streptococcus, be associated before the true disease can be established. It may be that the disease we see in practice occurring naturally is not the true disease but is a condition caused by the action of the virus but masked through the activity of the streptococcus, etc. It will be some little time yet before definite experimental evidence will be available on these points.

B.—We are satisfied from our experimental work and from records of observations carried out by veterinary surgeons and cat owners that cats suffer from more than one type of infectious disease grouped under the name of " distemper." It is true that we have only made a detailed study of one condition, *i.e.,* enteritis, but we have had experience in connection with diseases which, though termed distemper, present considerable differences from the condition we have studied. There is a disease characterised by a catarrhal inflammatory condition of the respiratory tract. As far as we can judge, the lesions vary from a simple nasal catarrh to true broncho-pneumonia. We assume this to be a different type of disease for three reasons: (1) in our transmission experiments in connection

with enteritis, though on some occasions the infected cats have lived for several weeks, they have never presented any symptoms in any way resembling this respiratory disease; (2) we have had under our care cases of this respiratory disease. Recoveries take place fairly regularly and recovered cats are susceptible to experimental infection with infectious enteritis; (3) a series of observations made by a well-known cat breeder and verified by a veterinary surgeon show that cats may suffer from the respiratory condition and recover, and several months later may fall victims to infectious enteritis and die. It is true that these observations were made on clinical grounds only, but from the precise and exact information we have received we feel that the evidence is very clear. I have no doubt that veterinary surgeons with cat practices can amplify such observations.

Cats also suffer from several types of eye trouble. We have not been able to show that such troubles bear any relationship to infectious enteritis, nor in many cases have they any connection with the respiratory disease.

C.—Hindle and Findlay showed that cats which had recovered from the disease they described as infectious enteritis produced in their serum protective substances which, when injected into susceptible cats, gave rise to a passive immunity. Urbain, on the other hand, showed that by the use of formalin on tissues from affected cats an antigen was produced which when injected into susceptible animals produced immunity. We have not attempted to repeat the work of the former observers, but have confined ourselves to the question of active immunity.

Our experiments have given results which are very highly suggestive that an active immunity can be produced against infectious enteritis. We have followed on the lines adopted by Urbain. While our results are not so clean cut as those he obtained, they strongly indicate that with an improvement and possible adjustment of the method a high degree of active immunity can be induced. Our problem now is to decide on the necessary improvements for the obtaining of the maximum degree of protection.

We have not yet attempted the preparation of hyper-immune serum. This is partly because we have not yet found an animal other than the cat susceptible to the disease and the amount of serum which any individual cat yields would be of little value. The greatest problem in this work is the obtaining of suitable susceptible animals. We have had to breed cats specially for experimental purposes. As far as we can ascertain, there is no other animal which can be used for the work.

Discussion

The discussion was opened by Mr. J. Stewart, M.R.C.V.S., of Beckenham, in the following terms:—

At the outset I wish to congratulate and thank Major Dalling for his excellent paper. It is a paper which I, in common, I am sure, with all practitioners whose daily work brings them into contact with the diseases of the domestic cat, have read with great interest and appreciation. I dare to hope that this paper marks the beginning of a steady and sustained effort to explain and classify the contagious diseases of the cat. (Applause.)

Although these particular diseases are not generally considered to be of grave national or economic importance, they do, nevertheless, occasion very great loss to the cat-breeding community, no less than to the large cat-owning public. To-day, when the general practitioner is becoming increasingly conscious of the importance of small-animal practice, and the greatly increased skill demanded of him by the public, furtherance of our knowledge of these diseases and of our ability to combat them will bring its due rewards of appreciation.

At present, the nomenclature of these diseases seems to be in a state of some confusion, and when one hears a reference to "distemper," "show fever," "cat 'flu," "cat plague," "infectious enteritis," etc., from owners and consultants alike, it leaves one entirely guessing as to which particular train of symptoms is indicated. Such chaos should *not* exist, and I hope that an authoritative statement will soon be made, laying down the broad lines of distinction between the maladies, if such a distinction exists. The reason for the latter part of this remark is this: Professor E. Hindle, on October 26th, 1932, gave an address on feline distemper, before the Comparative Section of the Royal Society of Medicine. This address was the result of an investigation carried out by him and his co-worker, Dr. Findlay. The conclusion arrived at was that these diseases were primarily due to a filterable virus and that the variety of symptoms found was due to secondary invaders. This conclusion is not acceptable to the clinician—at least until further evidence is produced, especially evidence from the result of immunological experiments.

The clinician recognises at least two distinct diseases:—

(*a*) A disease in which catarrh of the respiratory tract is the prominent feature.

(*b*) A disease in which there is usually some gastro-intestinal disturbance.

Major Dalling's work to date seems to support this view and the disease under consideration here is the latter, and is more correctly referred to as "infectious feline enteritis." Even this name, however, seems to me to be unsatisfactory

inasmuch as, in many instances, the *post-mortem* examination reveals little or nothing, at least macroscopically. It seems therefore, that we should endeavour to find a new name, one which expresses the deadly nature of this disease—as, surely, if any disease is deserving of the word "deadly" this is it. Let it appear in a cattery where there is young stock and its effects will be devastating; the majority, if not all, of the young cats will be wiped out, the breeder reduced to tears, and the attendant veterinary surgeon to despair at his own impotence in the face of such a calamity.

Year after year one sees the finest young cats in the country, being shown to-day, carrying everything before them, and in the same day of the following week being merely a name and a memory.

Major Dalling, in his summary, says: "This is a contagious disease of cats characterised by illness of short duration in which no characteristic clinical symptoms are shown."

How, then, is one to diagnose the disease? In a cattery it is unfortunately only too easy, because by the time you are called one or more kittens will have died and others will be decidedly ill. The clinical picture is a fairly constant one, and is briefly this:—

(*a*) Refusal to feed.

(*b*) Profound depression—this is most marked; the attitude is characteristic, a crouching position being adopted, with head lowered and perhaps hanging over the water dish.

(*c*) Frequent vomition, the vomit being frothy and bright yellow in colour.

(*d*) Marked constipation, with perhaps the passage of mucus.

(*e*) Rapid loss of subcutaneous fat.

Death supervenes in the majority of cases, the mortality probably exceeding 80 per cent., and usually occurs within 48 hours. The single case of a household pet offers more difficulty of diagnosis, at least if one sees the case early, but there is often a history even here. One is told that several cats in the neighbourhood have been poisoned and they are afraid that this one has been poisoned also. Do not be misled! You will be quite safe in saying, "No! This is a case of so-called 'infectious enteritis.'"

Treatment, by materials at present available, does not appear to influence the course of the disease to any extent, and we must wait for the bacteriologist to supply us with more efficient weapons—weapons in the nature of an anti-serum, or, better still, a method of protecting young stock by active immunisation.

Major Hamilton Kirk (London), continuing the discussion, expressed the opinion that Major Dalling had made an excellent contribution to the study of feline disease. When Major Dalling attempted a task he generally carried it to a successful conclusion. As one who had taken a more than ordinary interest in the diseases of cats for a number of years, he (Major Kirk) had been very gratified to know that such an able man as Major Dalling had started the investigation referred to in the paper. It was only those veterinary surgeons engaged in feline practice who could appreciate the difficulties of attending to feline animals. They were undoubtedly difficult to deal with, and their diseases had been very puzzling. For years he had contended, as he believed most of those present knew, that feline distemper and feline enteritis were two absolutely clinically-distinct diseases. It had been a source of wonderment to him, in the absence of any causative organism, how anyone could think differently. Why should they call everything distemper? There were two distinct clinical pictures, and any observant person could describe them. Mr. Stewart had described the features of what he (Major Kirk) called feline enteritis, and these features, he contended, were distinct from the features of distemper. From what he had heard from Major Dalling, the opinion that gentleman held appeared to be quite confirmatory. In regard to the question of its infectious nature, he had been very puzzled about that because, as he had been telling Major Dalling before the meeting, he had had successive litters of healthy cats (he bred Siamese cats, and they were very expensive animals to breed) from each of which one or perhaps two had been picked out (just as lightning might strike one animal) and had been dead in from twelve to about 24 hours from what he called specific infectious feline enteritis, and yet other cats in association had not contracted it. On the other hand, he had had whole litters wiped out in three instances. He once had a fine, healthy Siamese cat brought in to board. It was such a beautiful specimen that he said to his wife, "I will not send this cat down to the cattery." It played at home with two of his other kittens. One morning, at the end of about two weeks, it vomited, and it was dead within 16 hours. His little kittens, which had not had any disease at all, did not catch it. Was it that there was in existence a very infectious disease and another that was non-infectious, both characterised by enteritis? On the other hand, Major Dalling would tell them that he had found enteritis of cats to be frightfully infectious. The last four kittens that the speaker had reared had, all of them, at the age of about one week, a thick yellow ocular discharge, but otherwise appeared to be normal. They recovered from the condition after some weeks. One of them went down with the coryza type, which Major Kirk called distemper, and three months later another had enteritis, and he lost three out of the four. That was very discouraging. The practitioner wanted a cure or a preventative, or both. The speaker had tried almost every possible line of treatment for these cats, entirely without success. If one recovered, its recovery was due to good nursing or good luck, but he had tried out a new line of treatment for about a year, namely, the use of a bacteriophage. He had used a particular preparation called "Enterophagos." As probably everybody knew, a bacteriophage was a mixture of lytic agents which preyed upon or dissolved bacteria. Each one seemed to have a predilection for certain organisms, and in enterophagos there were agents which attacked some seven or eight of the pathogenic organisms ordinarily found in the alimentary tract. In the human patient, he believed it had proved very valuable. As tried upon cats, in some cases he thought it did good, but in most others it did not. The reason was now understood, because if the

disease was due to virus, there was no organism to dissolve and they therefore could not hope for much result from enterophagos. The line of treatment which he was adopting in the meantime for enteritis in cats was to give them brandy in milk, with bismuth, three times a day, and to keep them upon hot-water bottles every hour of the day—for the 24 hours—and to feed them with glucose, given subcutaneously, in normal saline. If the vomiting was excessive he gave them capsules of anæsthesin, which arrested the vomiting. If one gave that merely by dropping it on the tongue, one numbed the cat's mouth and destroyed the sense of taste. As a general rule, one might say the treatment was to keep the cat warm, administer intestinal antiseptics, and keep it in comfortable and hygienic surroundings.

They earnestly hoped that Major Dalling would eventually evolve a method of vaccination against both diseases, as, if he could, he would save an immense amount of suffering and loss, and would certainly be opening a new door for the general practitioner. He did not think that many people realised how many millions of cats there were in this country—many more millions, he was sure, than there were dogs, because one required to have a licence for a dog but not for a cat, and practically every household had its cat. If ever a vaccine were made, he hoped that some method would be evolved of restricting its sale to the veterinary surgeon, in the same way as the sale of Burroughs Wellcome's canine vaccine was restricted. On clinical evidence they all agreed that there was no intercommunicability between the dog and cat as regards distemper. He was not sure, however, on that point as regarded enteritis, but he imagined that laboratory experiments would be able to decide that question for them before long. He just wished to thank Major Dalling for his very able paper and the work which he was undertaking, and he also desired to thank Mr. Stewart for his excellent contribution.

Mr. H. Steele Bodger (Tamworth) thought it appropriate, at that juncture, to pay tribute to Mr. Henry Gray's work on cats, because he was sure there must be few veterinary surgeons interested in felines who had not at some time or other applied to Mr. Gray for help and received generous assistance from him. He was sure that nobody wrote to Mr. Henry Gray about a cat disease without receiving by return post a long dissertation on the disease, with references and everything, and as a profession he thought they owed a great deal to Mr. Gray for the work he had done in that matter and that it would not be untimely for the meeting to thank him for the work which he had done for the profession, particularly on the clinical side. (Applause.)

Continuing, Mr. Steele Bodger observed that he had little to add to what had been said, except his note of despair to that already sounded by Major Hamilton Kirk. He (Mr. Steele Bodger), in common with the other speakers, must confess to being completely baffled as regards the adoption of curative measures for that disease; in fact, he was forced to one of two conclusions—that those cats that had recovered had done so in spite of his treatment; alternatively, that they had done so because his diagnosis had been in error. (Laughter.) Certain it was that the older the cat the more hope there was of recovery, but he confessed that in his hands the mortality amongst young kittens was neither less nor more than 100 per cent. (Laughter.)

He was rather perplexed to know in which camp to range himself—with those who considered that feline distemper and infectious enteritis were one and the same disease or two separate diseases, because he had, last year, in one cattery of nearly 40 cats, the two diseases apparently running concurrently, and he might say that those cats which did not die of one type seemed to die of the other. That might be coincidence, or it might be that in different parts of the country they got different phases, but it was astonishing how cases cropped up without any apparent communication one with the other. One might have a district in which one might get a number of cats reported, within a few days, as having been found very seriously ill, and in some outbreaks a fatal termination was extraordinarily rapid. Last September those cases became so frequent and treatment was so hopeless that in a number of them he delayed his visit for two or three hours, feeling quite certain that when he arrived the animal would be dead, and that proved to be the case.

Major Kirk had mentioned treatment with saline and glucose. Perhaps Major Kirk had been more fortunate with the injection of glucose than he had been, but it required great care. In his opinion rigid asepsis was necessary to avoid the formation of an abscess, particularly if one used glucose in association with hypertonic saline solution.

One incident which brought home to him the rapidity with which the disease might develop was a case in which a large breeder of cats had a show kitten which had an affection of an eyelid. It was sent to London to be operated on, there being, of course, no veterinary surgeon in the Midlands capable of operating upon a cat's eyelid—(laughter)—and the cat was kept a fortnight and returned. He saw it within two hours of its return, and it was then in a moribund condition and died in half-an-hour, but the owner was assured by the veterinary surgeon in London that the animal had shown no signs of ill-health prior to departure and that in the morning it had eaten up its breakfast and was apparently healthy in every way.

One symptom which had not been mentioned was the apparent inability to swallow: the animal would put its head over the dish, but seemed quite unable to swallow any food, even though the desire to do so was there.

He would like to join Major Hamilton Kirk in saying how pleased those of them were who had anything to do with cats, that Major Dalling had taken up that subject.

Finally, he desired to ask about the period of incubation. He had had an outbreak in his own catteries, when animals would be infected one after the other within a few hours. At another time, they would get a cat brought in, and succumb, and they would disinfect the place as much as possible and yet other felines present at the time would not develop the disease for 28 days. This period of 28 days between outbreaks at the same cattery had occurred so frequently that he had been forced to the conclusion that there could sometimes be an incubation period of as long as from three to four weeks.

Major Hamilton Kirk asked if he might correct an erroneous impression that had arisen. When he had said that his kittens had got a thick yellow ocular discharge at a week old, a gentleman behind him had said that the kittens were blind and had not got their eyes open. The fact was that the discharge formed under the eyelids before the eyes were open, and he thought it was a condition of ophthalmia neonatorum. As regards glucose, it was a regular measure in his practice to inject glucose in saline, and he had

not yet experienced the abscess formation referred to by another speaker.

Mr. K. Ollerhead (Kensington) stated that he had little to say on the subject under discussion, but he felt it would not be right of him not to pass on the experience he had had in a city practice with hundreds of cats.

He had regarded the two conditions described by Major Dalling as two separate diseases. That which the latter termed the catarrhal and respiratory type he had considered to be distemper and he must say that from 80 to 85 per cent. of cases were of that type, and it was the one which gave them the most trouble. He found, it was true, that the majority recovered, but the trouble was that most of those outbreaks occurred when the catteries were full of boarding animals, and it was difficult to give a satisfactory explanation to the owners.

In this type the spread of infection was extremely rapid. Often the first warning was that the nurse had heard one cat sneeze and by the following day a number of the others in the same room were showing the same symptoms.

He would like to mention that they had tried the same treatment as Major Kirk in the use of bacteriophage for that type, and they had found that it gave quite good results.

The other type—infectious enteritis—caused both the owner and the attendant veterinary surgeon much less trouble, as it was generally fatal within 48 hours, and in his opinion did not spread.

Mr. Steele Bodger had enquired as to the best method of disinfecting afterwards: he (Mr. Ollerhead) also found that it was very difficult to know what to do after an infection of the respiratory type.

The Chairman (Major A. Spreull) desired to add a little to what other speakers had said. To his mind, there was no doubt that they had to deal with two distinct diseases, and that, as in the dog, there existed both distemper and infectious gastro-enteritis.

In distemper they had a multitude of symptoms which were manifested early on—sneezing, catarrh and sore throat. Perhaps Major Dalling could tell them if the hæmolytic streptococcus could cause the throat form, as he understood that it was this organism which was the cause of sore throat in scarlet fever.

The gastro-enteritis described was practically symptomless, and that, he thought, was where those who had boarded cats, in addition to their infirmary, were often landed into trouble. A cat was brought in, seemingly healthy, and remained healthy for a week or two, but suddenly the attendant told one that the animal was depressed and not taking its food. One attempted everything possible in the way of stimulants and other treatment—saline and glucose injections, hot-water bottles, etc.—but on the following day it was passing fluid motions and blood, and the end soon came.

He hoped that a solution would soon be found of the problem presented by these conditions, which were certainly the two most serious diseases of the cat.

Mr. E. C. Bovett (Clifton) said that the only reason for his rising was that there seemed to be one or two points which were still undecided. Not that he intended to settle them—(laughter)—but he thought that they, as clinicians, should give Major Dalling all the assistance possible in his attempt to master that terrible scourge amongst cats.

He was firmly of the opinion that the diseases were quite distinct. Infection with the enteric form certainly left an immunity, but, in his view, it was not often that an immunity was left after infection with the respiratory form—a circumstance which would suggest that the diseases were distinct.

Another thing which he thought might be more definitely settled in discussing that subject was the age of the animal of which they were talking. They were loosely applying the terms "cat" and "kitten," and he was not quite certain when a kitten became a cat. (Laughter.)

In the respiratory form cats of all ages were susceptible, but it was quite definitely only kittens, *i.e.*, animals under one year, that were susceptible to the enteric form.

In regard to the disease in cats, Mr. Stewart had given them a very clear picture of the trouble, added to which was the thirst mentioned by Mr. Steele Bodger, which was also typical, but another typical symptom was a plaintive cry from a kitten so affected. That would suggest the existence of a very painful condition, and yet on *post-mortem* there did not seem any evidence, in the stomach or intestines, of a condition productive of such acute pain.

Another difference, in his opinion, between the two diseases, was that the respiratory form would of itself disappear from catteries, and they did not consider it to be so essential, therefore, to disinfect the cattery (although this was always done) after an outbreak of the respiratory form as it undoubtedly was in the case of the enteric form. Unfortunately, however, it appeared to be impossible to practise adequate disinfection against a recurrence of the enteric form.

The period of incubation had also been the subject of some discussion, but he would unhesitatingly say that it was six days and no longer. He had come to that conclusion from some unfortunate experiences of castrating cats: in one or two cases it had unfortunately been necessary for him to go to see the kitten six days after it had been taken away. In fact, the operation of castrating cats was now something of a major one, in regard to sterilising everything, even themselves.

Major Hamilton Kirk had said that he was not so sure that the disease was not communicable to the dog. He (Mr. Bovett) was fairly satisfied on that point, because when his catteries had been put out of action through the occurrence of the disease, they had used them for puppies, and with no unfortunate results. Major Kirk had not given them details of the one kitten that died on his own premises, while the others were unaffected, but he (the speaker) thought that might be explained by the fact that Major Kirk had himself introduced some slight infection which gave the latter some immunity; alternatively, it might not have been an infective form at all, because, in his experience, kittens did not escape infection when in contact with it.

Mr. Ollerhead joined issue with Mr. Bovett, who had expressed the opinion that from the respiratory type there was no immunity. His experience was that there was very definite immunity from the respiratory type—so much so that should the necessity arise he would feel almost as safe in putting a cat which had previously had the trouble into an infected cattery, as he would in putting a dog which had previously had distemper into a distemper ward. He thought there was evidence of most marked immunity.

Miss K. Shedlock (Esher) observed that she had always found that the respiratory form had a very low mortality. Did Major Dalling consider that cats that were left with snuffles were immune,

because one might get a good cat that snuffled and want her for breeding purposes. With the gastro-enteric form, it always seemed to her that there were two forms of infection. There was the kitten form, most common at about three to four months. This always appeared to be very acute and one generally got death in 24 hours, during which there was little vomiting, but otherwise the symptoms described by Mr. Stewart. The other form attacked cats from nine months onwards, as well as kittens. These vomited, too, but did not get constipation. They always had profuse diarrhœa, which seemed to linger on for about a fortnight, three weeks or even longer, but they often recovered. The incubation period seemed to be seven days with the kitten form, but in a cat of nine months and over one did not appear to be safe until after the twenty-eighth day, as Mr. Steele Bodger had remarked.

Mr. N. S. King said he thought Mr. Stewart's description of the enteric type was particularly apt. The only remark he had to make was in regard to the peculiar cry that was made by the cat, as if there was definite pain on manipulation. He thought the majority of these cases were seen in the kitten of about three or four months old and that the older cat, after that age, apparently showed more resistance, and as Miss Shedlock had said, some of the cases went on for a considerable time—a fortnight or three weeks—in rather an indefinite sort of way.

The Reply

Major Dalling, in replying to the discussion, said he was very grateful indeed for the way in which the members had discussed his paper. He had learned a tremendous lot that morning about cat diseases, particularly from the clinical side of the disease, as he had previously not had the opportunity of hearing from so many people. He felt that those who thought that there were at least two definite specific diseases of an infectious nature in cats were probably right. Most of the speakers had spoken from the clinical side. The few experiments that had been made up to date on the immunological side would seem to verify that observation and conclusion. However, in all research work it was necessary to verify these things and repeat them over and over again before one could say with any degree of certainty that any particular point had been proved. It was a great pity that the nomenclature in regard to such diseases was in a vague state. That was not only so in cat diseases: one term was used to describe quite a variety of conditions. He had no doubt that the veterinary profession would some day see fit to set up a committee to go into the question of the names of diseases, so that when a disease was spoken of we should all know the exact condition referred to.

He thought that Mr. Stewart had given an excellent description of the clinical cat enteritis. The disease as they saw it in the laboratory—the disease which they introduced either by contact or by injection of the infected material—was not quite the same, in that the cats did not seem to go through all the phases described by Mr. Stewart, but when a cat did linger for a day or two the symptoms described by Mr. Stewart certainly were found. One or two speakers had referred to the howling or mewing of the cat. That was a thing which he entirely omitted in his paper, but it was quite a feature of the disease, especially if one handled the cat. He was satisfied that the cat was in intense pain, especially on manipulation of the abdomen, if enteritis was present.

The question of the period of incubation had been brought up. He, of course, was speaking only from the experimental point of view, in which it was found that within 48 hours the cat's temperature rose and they took that as a definite sign of infection. He admitted that when the cat's temperature rose in the first instance nothing much would be seen, as far as symptoms of disease were concerned. In fact, the cat's temperature might drop again and it might be four or five days before one could definitely say that the cat was suffering from enteritis. Long incubation, which had been referred to by some of the speakers, namely, 28 days, in the older type of cat, seemed to him to be very interesting indeed. They had not succeeded in infecting with enteritis a cat over a year old. The cats on which they had been working were probably three or four months old—nothing older than than that—but they had tried to infect cats brought in from various places and cats given to them by various people—older cats—and had never been able to set up the disease in these older cats. In all probability these cats were immune, having received a small dose of infection in their youth, much the same as in the case of canine distemper. To explain the long incubation period he suggested that it might be that the virus introduced was of very low potency, or that the cats had a certain amount of natural immunity that had broken down. Again, as he had stated at the opening of the meeting, it might be necessary to have collusion of one or more types of micro-organism before definite symptoms were produced.

Major Hamilton Kirk had given a very useful summary of his experience in connection with cats. He had referred to some cats of which only one became infected with enteritis and the others all escaped. His (Major Dalling's) only question was, was it true enteritis that the one cat had? They had no way of proving that. It might be that it was not a case of true infectious enteritis. Major Kirk had also brought up the question of the disease being communicable to the dog. The disease with which the speaker had worked was certainly not communicable to the dog. Dogs specially bred for distemper work, now in the fourth and fifth generation, had been used to see if they were susceptible to feline enteritis, and no result had been obtained. He did not see that the bacteriophage or enterophage could have very much effect in treatment or prophylaxis. He thought that the only hope would be a vaccine. He did not see how it could be a serum because of the difficulties in its production. The only animal in which serum could be produced would be the cat, and the quantity produced would be so small that its preparation would be impracticable.

Major Spreull had brought up the question of the hæmolytic streptococcus causing the respiratory form of the disease. The speaker would not like to pass an opinion on that because they had not yet studied the respiratory form. From the little he had seen of it he agreed with the various speakers that the disease was highly infectious, but it was not very fatal. The percentage of recoveries was high. He had also said, at the beginning, that an animal which had suffered from the respiratory form was still susceptible to the enteric disease. That was one of the arguments for classifying the diseases. He did not know what to believe in connection with the specificity of the respiratory form of the disease. They had heard that cats might quite easily become infected at a later date with, apparently, the respiratory disease from which they had

(*Concluded at foot of col.* 1, *page* 1148.)

General Article

THE SELECTION OF THE COMMERCIAL HORSE

No. XII.—THE BREEDING AND USE OF THE SUFFOLK HORSE

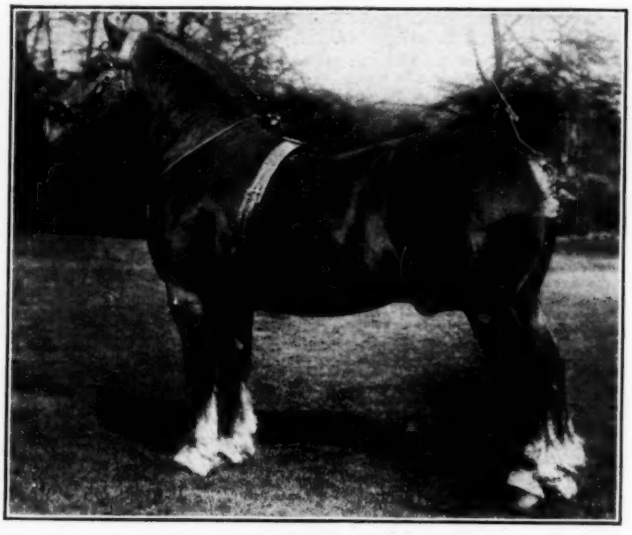
A. T. PRATT
Morston Hall, Trimley, Ipswich

The Suffolk Horse is now to be seen in most parts of the country, and in fact some of the best animals of the breed are being bred far from the original home of the Suffolk Horse.

To-day the breed stands with a long line of ancestors at its back, improved undoubtedly beyond the imagination of the most optimistic of bygone breeders and admirers. For evidence of the purity of the breed it is unnecessary to refer to pedigrees or any genealogical charts. Suffolk Horses are all "Chesnuts," and always breed true to colour—a striking feature in the quadruped world.

The first Volume of the Suffolk Stud Book, which contains the History of the breed to the time of its publication, tells us that there are seven shades of chesnut—the dark, the mahogany or liver colour, the dull dark chesnut, the light mealy chesnut, the red, the golden, the lemon, and the bright chesnut.

The breeding of Suffolk Horses has for generations proved a remunerative sideline to the farmers of poor light land in East Anglia; in fact, in pre-war days, when the export trade was at its height, the breeding of Suffolk Horses might be described as the mainstay of many agriculturists. During the lean years which followed the boom of post-war years, the Suffolk Horse proved a useful sideline to many agriculturists who continued to pin their faith to the ultimate dawn of a brighter outlook for the agricultural industry and it is in a large degree due to these breeders that the breed is in a position to-day to fufil the demands which it is meeting in every direction.



Morston Gold King

Suffolk stallion, six years old. Property of Mrs. Evelyn Rich. Bred by A. T. Pratt. First Prize, Suffolk Stallion Spring Show, 1934.

[*Photo*: *Sport and General.*

Those who continued breeding this clean-legged, active, chesnut draught horse are to-day reaping some reward for the faith which they had in the Suffolk Horse, for, knowing the merits of the animal they were breeding, there was no doubt that when the time did come for increased activity in the world of industry and commerce the Suffolk would be in demand.

It need hardly be repeated that, as an agricultural horse, the Suffolk has no superior. With the increasing market-garden work the Suffolk has proved to be the ideal, for in this class of work, a horse with a good sound and not too large foot is best suited and the Suffolk possessing these qualifications has been sought after by horticulturists. The champion Suffolk stallion at the 1934 Ipswich Royal Show, when not on his round during the season, is carting for a large horticulturist in the north of England. Docility amongst Suffolk stallions is yet another characteristic of the breed.

During recent years there has grown a great demand for Suffolk Horses for city and town work, and at the sales held annually at Ipswich and Norwich, under the auspices of the Suffolk Horse Society, an ever-increasing number of buyers from all parts of the country, including Scotland, Wales and Ireland, have attended and purchased Suffolk Horses for this class of work. Corporations have been conspicuous in this respect and the animals have given every satisfaction; in fact, the Chief Veterinary Officer of

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previously recovered, and they had also heard that that was not so. He had very little experience of that matter, except that a local practitioner near him had assured him that his patients came back time after time suffering from the respiratory form. The question would not be settled until some proper experimental immunity work could be carried out.

Miss Shedlock had brought up a question which had interested him immensely, namely, the question of snuffling in cats. When they had started to keep cats at the laboratory, they had imported cats and had kept them in isolation for some time before transferring them to their breeding quarters. There were amongst the imported cats two snuffling cats, and he believed that these two animals had set up an outbreak of the respiratory disease in their cattery. He had quite a respect for the snuffling cat as a carrier of the respiratory disease. He did not think he had any further remarks to make, except that he appreciated the way in which the members present had entered into the discussion and the enormous amount of information that he had received from clinicians who understood cat diseases.

a large Corporation in the North of England says that the Suffolk Horse has only one fault—"He will not wear out." Brewery firms in various parts of the country have found Suffolk horses an ideal and economical form of traction for short journey work and in recent years some of the best geldings of the breed have been purchased for this work, and as a proof of their suitability for this type of labour and purchasers have come again and again to the sales.

For crossing purposes Suffolk stallions are of great value and many breeders of cross-bred horses use Suffolk stallions on hairy-legged and other mares, the progeny resulting in an active clean-legged type which is in request by modern horse users.

The breed has proved to be one of the world's best and most economical workers wherever horse power is required.

Clinical Communication

SUBACUTE ARSENICAL POISONING IN HORSES

R. BENNETT, F.R.C.V.S.
ROMFORD

On June 1st I was called to see three horses which had been turned out on a marsh near a factory. The grass of the marsh showed large brown patches and it was subsequently found that the marsh had been contaminated with smoke and effluent from the factory; it is probable that both of these contained arsenic.

The horses were all obviously ill. They were very tucked up, the mucous membranes were a bright red; and, at first observation, the animals gave one a strong impression that they were suffering from pleurisy. In all three cases the heart's action was much disturbed. The pulse rates and temperatures were as follows:—

(1) Roan horse. Pulse 78, weak and irregular. Temperature 101·4°F.

(2) Dapple grey. Pulse 72, weak and irregular. Temperature 101°F.

(3) Grey. Pulse 56, weak and intermittent. Temperature 100°F.

It was known that a case of arsenical poisoning had occurred on this marsh recently; consequently a provisional diagnosis of arsenical poisoning was made.

The horses were removed to warm stables, rugged up and fed with easily digested foods.

Samples of hair were taken from the manes and also from the hair under the jaws; and were sent to Dr. Clough of the Royal Veterinary College, London, for analysis. He reported that arsenic was present in all the samples in the following proportions:—

(1) In hair from the roan, approximately $\frac{1}{4}$ gr. of As. per ounce.

(2) In hair from the dapple grey approximately $\frac{3}{8}$ gr. of As. per ounce.

(3) In hair from the grey approximately $\frac{3}{8}$ gr. of As. per ounce.

Dr. Clough considered that the presence of these amounts in the hair justified a diagnosis of arsenical poisoning.

Arsenic was also found to be present in grass and earth from the brown patches on the marsh.

The noticeable clinical features in these cases were:—

(1) The disturbance of the heart's action.

(2) The very tucked up appearance, the abdomen being quite drawn up and tense.

(3) Evidence of pain. The horses grunted when made to move and showed great disinclination to move at all.

(4) Great thirst.

(5) Brick-red mucous membranes.

(6) In the case of the grey, bare scaly patches around the orbit, with some mucous discharge from the eyes.

The appetite began to improve in about three days after the horses were brought in, and the intense thirst abated in about a week.

In three weeks' time all the horses were apparently quite normal again, except that in the case of the grey horse the heart was still slightly intermittent.

Abstracts

[The Passage of Fluids through the Ruminant Stomach—II. With Observations on the effect of Long Starvation on Anthelmintic Efficiency. CLUNIES ROSS, I. (1934.) *Austral. Vet. Jl.*, x, *1*, 11-23.]

In this paper Ross records his observations on a series of 320 sheep. His previously recorded conclusion (*Austral. Vet. Jl.*, 1931, 122) that starvation was the most important factor influencing the passage of fluids to the abomasum, was not confirmed.

It was found that the nature of the ruminal contents more or less indicated whether sheep had been starved or not, as with starvation the rumen contents become more fluid and watery in comparison with the semi-solid or solid contents in unstarved sheep.

In groups of sheep starved for 48 hours the bulk of the water administered as a drench, on a given day, may or may not pass direct to the abomasum in the majority of cases, but what factors may determine this have not been demonstrated, though it is thought that temperature and atmospheric humidity, in conjunction with the duration of starvation, may influence the result.

The administration of copper sulphate solution was found to have a marked influence in securing the direct passage of all or a considerable part of the fluid to the abomasum. The difference in the efficiency of copper sulphate solution and water in ensuring direct passage was significant in all cases whether the animals were unstarved, starved for 16-24 hours or for 48 hours.

As a result of experiments with the two small groups of animals it is considered that prolonging the period of starvation beyond the 16-24 hours led to no increase in anthelmintic efficiency of copper sulphate against *Hæmonchus contortus*. There was, however, some indication that anthelmintic efficiency was slightly higher in starved animals than unstarved animals.

The anthelmintic efficiency of copper sulphate is considered to be largely due to its ability to pass in solution direct to the abomasum in a high percentage of cases. The use of this solution as a vehicle may make possible the direct passage of other drugs to the abomasum with a consequent increase in efficiency against intestinal parasites such as *Trichostrongylus* spp. *Oesophagostomum* and *Chabertia*.

J. S.

* * * * *

[Parasitological and other Problems in Sheep in Western Australia. Ross, I. C. (1934.) *Jour. of the Council f. Scientific and Ind. Research,* Australia, 7 (1), 1-8.]*

The increasing prevalence of worms is an important factor in the difficulties which have been experienced in the rearing of Merino sheep in the Midland and Great Southern Districts of Western Australia. The probable importance of nutritional factors and parasitism is discussed. It is considered that the small trichostrongyles are the more serious of the worms, but that the importance of *Chabertia ovina* should not be overlooked. Under normal conditions the severity of nutritional conditions to which the young sheep are subjected is more important that the degree of parasitic infestation.

R. T. L.

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[Experimental Studies on the Transmission of Gapeworm (*SYNGAMUS TRACHEA*) by Earthworms. Clapham, P. A. (1934.) *Proc. Roy. Soc.,* Series B, *115* (791), 18-29.]*

That earthworms occasionally play some part in the transmission of the gapeworm of poultry has long been suspected. Clapham shows that the lesser earthworm *Eisenia fœtida* is a true and very efficient intermediate host. *Lumbricus terrestris* is also implicated but is not so important.

Eisenia fœtida infected from the fæces of infected rooks, partridges and pheasants were infective to chickens. *Syngamus merulæ* undergoes the same life cycle. In earthworms *Rhabditis pellio* is a frequent source of confusion with the larvæ of *Syngamus trachea*. Using experimentally infected earthworms, the author was able to demonstrate that chickens ten weeks old are normally resistant to infection but when fed on diets deficient in vitamin A and in calcium this resistance can be broken down and infestations set up.

R. T. L.

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[Heterakis Infection in Fowls. (Trans. title.) Claussen, L. (1934.) *Deutsche Tierärztl. Woch., 42* (2), 17-20.]*

Claussen records several cases of chicken infestation with *Heterakis papillosa*, the pheasant cæcal worm, and observes that in the chicken the parasite tends to induce a more marked reaction than in the pheasant.

In the cæcum the sub-mucosa is strongly hypertrophied and forms broad outgrowths supporting well marked ridges of the mucosa. Nodules are formed by the larvæ and these cause atrophy of the surrounding gland tissue, the whole being surrounded by an inflammatory zone.

P. A. C.

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[Pyrethrum as an Anthelmintic for *ASCARIDIA LINEATA*. Rebrassier, R. E. (1934.) *Jour. Amer. Vet. Med. Ass., 84* (4), 645-648.]*

Rebrassier has found that a preparation containing 0·8 per cent. pyrethrin, in doses of 200 milligrammes, forms an effective vermicide in the treatment of *Ascaridia lineata* infections in chickens.

Using 30 chickens, 333 worms were passed in 72 hours and 17 were found at autopsy, the efficiency of the drug being 95·14 per cent. In 24 birds, the treatment was 100 per cent. effective. Pyrethrin is especially useful as it is lethal to the parasites, non-toxic to the host and needs no purgative.

P. A. C.

* *Contributed by the Imperial Bureau of Agricultural Parasitology.*

VETERINARY INSPECTION IN LIMERICK

"It is understood," says the *Cork Examiner*, "that the attention of the Department of Agriculture is to be directed to the under-staffing in the City Veterinary Inspector's Department, with consequent delay in the work of examining carcases at the bacon factories. In Limerick there are only four veterinary inspectors to cope with the work to be done under the provisions of the Meat Act, and this is obviously unfair, not only to the staff, but to the bacon curers. It would be a serious matter if, because of inadequate staffing, inspection of meat could not be carried out with punctuality and regularity, and it is to be hoped the Minister for Agriculture will appoint additional inspectors."

Report

COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE

VETERINARY DEPARTMENT

Report for the Year 1933-34.

The report of the Chief Veterinary Officer, Major D. S. Rabagliati, summarises the work carried out by his Department under two headings—The Diseases of Animals Acts and Orders, and the Milk and Dairies Legislation.

THE DISEASES OF ANIMALS ACTS

The chief feature of the year under this head has been the great increase in the number of outbreaks of sheep scab. This, in common with certain other counties, has been especially noticeable along the Pennine Chain from Derbyshire to Cumberland, and necessitated the Ministry of Agriculture imposing a double-dipping area on two portions of the West Riding during the winter months and also including two large portions of the County in the Pennine Range (Movement of Sheep) Order of 1934. In order to cope with the work the addition to the staff of one assistant veterinary officer has been necessary. No less than 88 outbreaks of sheep scab were dealt with as against 16 the previous year. It is explained that many of the affected flocks are very small ones and as the sheep of several owners are often involved in one moorland infection, the numbers are thus swollen.

Anthrax.—Only two cases of anthrax occurred out of 82 deaths investigated. This disease appears to be showing a steady and rapid decline. No infringement of the Anthrax Order came to light.

Foot-and-Mouth Disease.—Despite the presence of this disease in neighbouring counties, no case occurred in the West Riding although three reports were investigated.

The Tuberculosis Order.—As has now been the case for several years, the Tuberculosis Order was administered along with the inspection of herds under Part IV of the Milk and Dairies Order. No less than 1,173 cattle were slaughtered, of which 1,166 were cows or heifers. This compares with a total of 1,188 animals slaughtered the previous year. Of this total, 388 had tuberculosis of the udder and five had been proved to be giving tuberculous milk; 576 showed signs of chronic cough along with definite clinical symptoms of disease, and 201 were classed as emaciated. Of the total number found to be tuberculous 609 were detected as the result of routine examination, 442 were reported by their owners and 122 were notified by veterinary practitioners. It is interesting to note that of the cattle found on routine examination, 305 had disease of the udder substance, while of those reported only 88 were so affected, and that although regular visits were paid to 8,656 farms, tuberculous cattle were removed from only 772 or 11·2 per cent. of the farms. In three cows no evidence of tuberculosis was found on *post-mortem* examination. Two of these had been killed as the result of a positive biological report of their milk having been received.

Johne's disease is increasingly prevalent in the county and has been responsible for a large proportion of the 277 negative tuberculosis reports received.

Each veterinary officer carries out his own microscopic examination of milk and other materials for tuberculosis or other diseases and during the year 3,405 specimens were examined, of which 306 samples of milk and 362 of expectorate were found to contain tubercle bacilli.

Regular visits to the various markets are made and not only is the stock exposed for sale examined, but there is a strict supervision imposed upon the manner in which the regulations connected with markets, the disinfection of floats and so on are carried out.

THE MILK AND DAIRIES LEGISLATION

The routine examination of cows involved 17,278 visits being paid to registered milk farms, on which 191,928 cattle were examined.

There were 50 investigations carried out under Section 4 of the Milk and Dairies (Consolidation) Act of 1915, in that tuberculous samples of milk had been reported by another local authority. In 27 instances a definite tuberculous cow or cows were detected and removed from the farms and in nine cases the offender had already been found and dealt with by the veterinary staff even before the complaint was received. Three cases were still under investigation at the end of the year and in eleven no tuberculous cow could be found. In addition, 35 reports of "bulk" milk being tuberculous were received from the County Laboratory as the result of the examination of milk produced in the West Riding. Many hundreds of samples of this milk are now examined annually both for bacterial count and by means of the biological test.

It is worthy of note that despite the great activity of the county and county borough authorities in examining "bulk" samples of milk, only 48 tuberculous cows coming within the scope of the Tuberculosis Order were found, of which 37 showed tuberculosis of the udder, whereas purely as the result of clinical veterinary examination of cows, 567 such cows were detected, of which 274 had the disease in their udders. Moreover, an additional 88 cows with tuberculous udders were reported. Thus, while bulk sampling detected 48 actively tuberculous cows, other methods have brought 1,128 to light.

During the year under review 9,008,435 bottles of milk were supplied by the County Educational Committee to school children. Before any contract is made to supply such milk the Veterinary Department is consulted regarding the conditions prevailing on the farm of supply.

Six enquiries were made into the milk supply of children who had been found to be suffering from tuberculosis of bovine origin. In two cases it was found that a tuberculous cow had been removed by the Veterinary Staff shortly before the enquiry and if no diseased animal is detected a " herd sample " from the farm involved is submitted to the biological test. It is pointed out that the length of time which frequently elapses between the infection of the patient and the onset of the acute symptoms renders it unlikely that the affected cow will be found in many cases.

Six enquiries were also made into the tracing of the mothers of tuberculous calves. In four instances a diseased cow was found or accounted for.

No less than 1,024 samples of milk from individual cows which failed to show the presence of tuberculosis on a microscopic examination and 197 " group " samples were forwarded to the County Laboratory for submission to the biological test. A total of 77 individual and 24 " group " samples, or 8·4 per cent. in all, proved to be tuberculous.

Advice on meat inspection is always given by the staff when asked for by any local meat inspector, but the demand has been disappointingly small.

A table is appended to the report showing the details of the farms inspected with the numbers of cows examined, the numbers found to be tuberculous and the categories of the disease detected.

LIVESTOCK CENSUS: NORTHERN IRELAND

All classes of cattle in Northern Ireland increased as compared with last year, the most noteworthy increase being that of 27·5 per cent. of heifers in calf, which numbered 31,946, the greatest number ever recorded. The total number of cattle returned (768,608) is the largest recorded since 1922, and is an increase of 4·8 per cent. as compared with 1933.

The total number of sheep (761,396) shows a small increase of 1·5 per cent. over last year. As was expected, all classes of pigs show a further increase, sows increasing by 52·4 per cent., and young pigs under six months old by almost 43 per cent., as compared with 1933. The number (380,296) is the largest ever recorded in Northern Ireland.

The number of poultry returned was 10,289,896, which is the highest figure recorded. Turkeys, geese and ducks were fewer in number, but the increase in ordinary fowl more than offset the decrease in all other classes of poultry.

N.V.M.A. Divisional Report

MIDLAND COUNTIES V.M.A.*

MEETING AT STRATFORD-ON-AVON

Captain Pillers on " The Clinical Aspects of Contagious Nasal Catarrh in Horses "

Prior to the meeting of the Midland Counties Veterinary Association at the Swan's Nest Hotel, Stratford-on-Avon, on Friday, June 1st, 1934, the members were entertained at luncheon by the President, Mr. G. F. Banham, whose hospitality was duly acknowledged. There were present Colonel G. Rees Mogg, Major A. A. Pryer, Messrs. A. W. Noel Pillers, R. H. Over, G. H. Eaton, G. R. Benbow, K. A. Miles, W. L. Sheffield, A. A. Forsyth, F. Davidson, S. Jennings, D. Forwell, H. S. Reynolds, G. W. Conchie, G. H. M. Hughes, S. M. Woodward, B. DeVine, T. W. Heelis, G. A. Cormack, John Scott, J. E. Blackwell, O. V. Gunning, C. F. Parsons, T. H. Hobson, James Martin, H. W. Steele Bodger, H. W. Griffiths, T. Marriott, J. T. Morton, G. F. Matthews, G. A. Banham, H. E. Powell and H. W. Dawes (Hon. Secretary).

The business opened with the reading of the notice convening the meeting and the confirmation of the minutes of the last meeting.

New Members.—Mr. Geo. Durrant, M.R.C.V.S., Veterinary Officer to the Leicestershire County Council, was nominated as a member by Mr. Phillips, seconded by the Hon. Secretary, and Mr. F. A. Davidson, M.R.C.V.S., Chief Veterinary Officer of the Staffordshire County Council, was elected as a member on the proposition of Mr. Over, seconded by Mr. Forsyth.

Representation on Parliamentary Committee, etc.—A reply was received to the resolution passed at the April meeting expressing the opinion that each Division should have a representative on the Parliamentary Committee of the Council of the parent body and that this Committee should engage the services of a competent Parliamentary Agent. The General Secretary of the National Association wrote: " The Council direct me to inform you that inasmuch as the number of members on standing Committees is limited to 15, effect could not be given to the first part without an alteration of bye-laws, a procedure which can only be carried out at the Annual General Meeting, and no proposal was made in Council that the bye-laws be amended for this purpose. With regard to the second part of the resolution, I am to say that the Council are already making enquiries into the question of the appointment of a Parliamentary Agent. At present we have a joint arrangement with the R.C.V.S."

*Received for publication July 26th.

Mr. DeVine thought that, as a substantial branch of the National Association, they ought to have had more consideration instead of having their proposal shelved, and proposed that the National Association should be pressed to engage an active and capable Parliamentary Agent. This was seconded by Mr. MacGregor and carried.

College Library.—Dr. Bullock wrote stating that an endeavour was being made to establish an endowment fund in order that the library of the Royal College of Veterinary Surgeons might be developed to its utmost extent, and asking for a contribution thereto. It was agreed to subscribe two guineas, the Hon. Secretary pointing out that there would be contributions also by individual members.

The Hon. Treasurer.—The Hon. Secretary stated that the Hon. Treasurer (Mr. W. H. Brooke), who had been seriously ill, was now making good progress. Mr. Brooke had written conveying good wishes to all the members and particularly the President, and stating that he hoped to be well enough to attend the next meeting. A suitable reply had been sent.

Past-President's Bereavement.—It was resolved that a letter should be sent to Mr. McKenzie, immediate past-President of the Association, offering sympathy with him in his recent bereavement.

Next Meeting.—On the recommendation of the Council, it was decided that the next meeting should be held in Birmingham in the latter part of September and that Mr. Hudson should be asked to give a demonstration and read a paper on a subject connected with cattle diseases, to be selected by himself.

President's Address

In his inaugural address, the President thanked the members for the honour they had done him in electing him to the position and assured them that it would be his earnest endeavour to uphold the traditions of the office and that he looked forward with confidence to receiving their loyal support. His greatest comfort was that he had what he called the "perfect secretary" to help and advise him. It was rather hard to attain any originality in giving an inaugural address, as most of the present-day problems of veterinary practitioners seemed to be well worn by discussion. The success of their meetings depended on the good attendance of the members and although he knew the difficulties of practitioners in affording the time, he asked them to do their utmost in this matter. In the Midland Division the attendances compared favourably with most. He always noticed that the best occurred when there was a practical demonstration of an operation or some other subject of interest and he hoped that during his term of office they would be able to arrange accordingly. He also invited members to bring any interesting *post-mortem* or other specimens for inspection. One great advantage in being present was that they had brought to their notice methods of treatment and specimens of which they would otherwise have little knowledge while carrying on routine practice. The little discussions which took place unofficially tended to make them all colleagues in the full sense of the word, and that was very essential to the smooth and easy running of every-day practice.

As most of them followed the art to gain a livelihood they might be forgiven for wondering what their prospects were in these days of agricultural depression and decreased income of so many hunter and dog owners. Personally, he was rather an optimistic individual and he certainly thought private practice still offered a fair reward. The law of averages applied even to their work and when they lost by the progress of motor traction and the creation of State veterinary services, other sources arose, such as work connected with pony clubs, greyhound racing, poultry diseases, etc. They seemed to be in a transition stage from private practice to State veterinary services in the matter of contagious diseases, but he refused to believe that the bulk of such work could not be done satisfactorily by private practitioners under the control of an administrative County Veterinary Officer. Every county should have such an official, but ordinary routine inspections connected with contagious diseases and milk and dairies Orders could be better and more cheaply done by a local veterinary inspector who had intimate knowledge of local conditions. It was iniquitous that a producer of graded milk, which bettered the health of the nation, should have to pay for licences and testing. Anything of this nature should be made as easy and inexpensive as possible to the producer.

The President was thanked for his address, on the motion of Mr. Over, seconded by Mr. DeVine.

Paper.—Mr. Noel Pillers then read a paper on "Remarks on the Clinical Aspects of Contagious Nasal Catarrh in Horses," a well-sustained discussion thereupon being opened by Major A. A. Pryer, R.A.V.C.

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REMARKS ON THE CLINICAL ASPECTS OF CONTAGIOUS NASAL CATARRH IN HORSES

A. W. NOEL PILLERS, F.R.C.V.S.

The widespread outbreak of nasal catarrh which occurred during the end of 1933 and the beginning of the present year has reminded equine practitioners of the importance of the ubiquitous equine streptococcus and its allies, and is a suitable excuse for my bringing the subject forward for discussion to-day. Early in his professional

life, the veterinary surgeon finds little difficulty in giving distinct labels to a number of the diseased conditions of the upper air passages. Later on many of these distinctions seem to disappear and one begins to see connections between affections which years previously seemed as the poles apart. It is to these aspects that I particularly wish to direct your attention this afternoon.

At the Llandudno Congress last year, Dr. Minett hit upon what I thought was a happy phrase with regard to bovine scourges when he referred to tuberculosis, Johne's disease, contagious abortion and mastitis as the " big four." Only one of Walley's plagues is thus left, *viz.*, tuberculosis, and in the stead of those gone are three others. I have previously alluded to the importance of itchy legs, periodontal disease, strongylidosis and coccosis in cart horses; when their remote effects are taken into consideration I think they, too, fully deserve Dr. Minett's appellation, when applied to the equine scourges. I have already dealt with itchy legs[1] and periodontal disease[2] but it will be some time before I shall dare to write upon strongylidosis, because it is such an extensive subject, with so many different aspects.

Soon after newly purchased horses have been shod and are doing light work, many of them go down with what one is wont to call *nasal catarrh, dealer's cold,* or *town fever.* If there should be an extension to the pharynx, one talks about *sore throat,* and should the glands in the sub-maxillary space or parotid region swell or require opening, *strangles* is diagnosed. What is likely to happen to new purchases and the other inmates of the stable depends upon a number of conditions. The new-comers may have had nasal catarrh at the dealers, yet they often become ill again and although the condition is comparatively slight, they seem to have brought it with them. If fresh animals are placed in a suburban stable they may escape altogether or only show a slight rise of temperature for a short while. Later, when moved into a town depôt, some go down with a typical attack, but others escape. Outbreaks vary considerably. In some, abscess formation is rare; in others, it is the rule, and again in others there may be abscesses in the first cases, then nasal catarrh only and finally an old horse or two may have abscesses with hardly another symptom. Occasionally, the sub-maxillary gland swells to the size of an egg and then retrogresses. Sometimes, none of the old horses get it and at others a high percentage of them do. Many of these have had it before, which means that any immunity acquired from the first attack is not lasting. The suggestion made by the late Professor Penberthy many years ago, of the routine use of the thermometer has saved many animals from serious illness. It is not difficult to produce figures which seem to show that an injection of anti-streptococcic serum, followed by streptococcic and other bacterins has prevented the disease amongst newcomers, and that such a bacterin is even good treatment. Yet, when control animals do not go down with the disease and affected ones seem to recover with good nursing and non-specific treatment, one begins to question specific therapy. There appears to be little doubt that the resistance of the patient, the conditions of hygiene, and the virulence of the causal organism, play important parts with regard to complications and sequelæ, if you recognise such distinctions.

A few years ago, the existence of a virus was invoked to explain some of the clinical aspects of different outbreaks, but to-day one hears little of it and Gaiger and Davies say definitely that strangles is due to *Streptococcus equi.*

The literature on the bacteriology of streptococci and their allies has become very voluminous and it is almost a whole-time task to keep in touch with it. If the cause of strangles behaves at all like some of the forms affecting man, or the cow's udder, then there is a wide field for speculation as to the possibilities of differing strains producing various clinical pictures. I understand that it is now believed that lesions remote from a streptococcal focus are due to the toxin, as distinct from the organism, and are allergic. It has very recently been shown that in man the poor response to the injection of anti-streptococcic serum may be and often is due to an absence of " complement." The transfusion of blood containing complement prior to the use of the anti-serum has given greatly improved results.

There may be other factors influencing the nature and virulence of outbreaks, but it is difficult to find them out and check them. What, for instance, is the exact effect of increased light, air space and fresh air? Is the position helped by surface drainage to the exterior, by iron mangers, by disinfection, or by balanced diets? Sometimes one sees severe outbreaks under apparently ideal conditions, so one blames virulent organisms. At others an epidemic of slight cases under faulty hygiene is said to be due to a mild infection. With a severe outbreak under defective conditions or slight cases under good ones, we attribute the position to the state of the hygiene. Such soothing reasoning lulls us into a sense of false security and important clinical questions remain unanswered.

Severe cases of *laryngitis* do not appear to be so common as they used to be and resort to tracheotomy is therefore rarer. When the temperature of the ordinary case returns to normal, and yet the nasal discharge persists and is marked when the patient is walked out, I have found that a single inhalation of one drachm each of menthol and thymol in a quart of hot water is very stimulating and beneficial. The value of this was brought to my notice by Mr. T. A. Dobie, M.R.C.V.S., some years ago. I have

not encountered anything like the percentage of persistent cases described by our Royal Army Veterinary Corps colleagues, Lawrence (*Veterinary Record,* November 10th, 1933), Davenport (*Veterinary Journal,* February, 1927) and Pryer (*Veterinary Journal,* 1929, p. 113), but I have noticed that if inhalations are given for several days continuously, quite a number of such cases will be encountered, and it is for this reason that I am not in favour of it as a routine measure, but prefer a medicated emollient application around the inside of the nostril. There comes a time in the course of many cases when the temperature either goes up again or disappoints one by staying up and an examination of the chest starts thoughts of bronchitis or broncho-pneumonia; here, anti-streptococcic serum is decidedly useful. Gentle counter-irritation of the chest seems comforting to the patient, but strong measures, especially the mustard basin, are in my view contra-indicated.

The type which was formerly called *irregular* or *bastard strangles* is only occasionally seen. An abscess may occur at the root of the tail. Sometimes a case will make an apparently good recovery, but after a few days at work there is a slight elevation of the temperature after anything heavier than a light job. Try what measures one may to arrive at a diagnosis or to prescribe a treatment, the patient gradually loses flesh, showing albumen in the urine, and finally dies. *Post-mortem* examination will often show a mesenteric abscess. It is generally situated in a very thick-walled structure which appears to be of glandular origin. Recently, I had to deal with a case which I thought was of this nature, but the sub-maxillary, prepectoral, precrural, inguinal and other glands started to increase in size and made one suspicious of " lymphoid hyperplasia." After slaughter, in addition to the greatly enlarged glands, masses of tissue were found anterior to the right kidney, which on microscopic examination appeared to resemble closely the picture which one can hardly distinguish between sarcoma and lymphoid hyperplasia. I feel sure that a few years ago this would have been called irregular strangles. I saw an outbreak a while ago in two stables in which three geldings developed marked *œdema of the sheath;* although all recovered after multiple puncture and the employment of a suspensory bandage, each animal was left with a much enlarged sheath. The serum-like exudate contained streptococci. Although little is heard today of the old *congestion of the liver* (early temperature, icterus, rapid loss of flesh, persistent fœtid diarrhœa and death), there is, to my mind, little doubt that this condition was really due to an invasion of the mucous membrane of the stomach and intestines by the strangles organism.

I suppose the title of this paper precludes the mention of lesions of the male genitalia, but a strangles orchitis may leave behind an infection which sets up characteristic lesions on the vaginal mucous membrane of most mares served for a month or so afterwards and may start an outbreak of nasal catarrh.

Some catarrh cases go on to *nasal gleet,* for which operative measures on the sinuses are necessary. It seems to me that it is only rarely that *pus in the guttural pouches* follows dealers' cold.

However, I have recently had related to me, second-hand, that a member of the profession had remarked that during the recent outbreak, he had seen more cases in which the guttural pouches have been involved than during his previous experience of twenty years. I think, too, that this is a suitable juncture at which to mention one or two of the points made by Arnold[3,4,5] in his articles on Strangles in India, He gives an intriguing account of the guttural pouches, grazing, the virus *cum* organism theory, and the apparent freedom of Ireland from the disease. As I had seen cases of strangles there, I wrote to a friend—one with a very large dealer's business—and the following is his reply:—

> " I have visited stables in England, Belgium, France and Switzerland, and I have not seen as many horses with strangles in any country as in Ireland; in fact, from the month of February, on through the spring and early part of the summer, you will see horses going to markets in carts with their heads almost in a bag of poultice and then they are put in a stable and the discharge left behind, perhaps for a clean horse to pick up on the following day. Then, in the course of seven or eight days, you will find your clean horse suffering from the disease, with his coat standing on end and his temperature right up.
>
> " I have often interviewed the local authorities to get them to adopt a scheme for stables to be disinfected after every market day, but they do not seem to take it up. That is the reason why strangles is so prevalent in Ireland. I remember in 1911 buying two horses in a fair, and they were put into a dirty stable. They were put to grass with other horses before we discovered the infection, and we had 45 which took strangles. Out of the 45 horses, 15 turned out to be 'bulls' and whistlers. We had to take them all in off the grass as the disease was spreading. If we put horses on the field upon which we had those 45 horses isolated, especially in the month of August, we still get strangles."

Basing the alleged freedom of Ireland from strangles on the fact that grazing drains the guttural pouches, Arnold had paddocks set apart in India for young stock and when these failed in their object, he had to invoke fresh false theories to explain away imaginary differences of grazing in the two countries.

I think that the escape of quantities of pus from the nose when the head is held down is due to its escape from the guttural pouches, but

a number of the views of Arnold seem to be very debatable, even when allowances are made for the difference in temperature of the two countries.

Many will be able to call to mind cases of widespread *exfoliating dermatitis* following nasal catarrh, which have been attributed to all kinds of agencies save the cause of strangles. Nevertheless, our French colleagues recognise it as the cause of this condition. With W. G. Berry, M.R.C.V.S., I recorded such a case with photographs in *The Veterinary Record* for 1913.[6] Is there any real relationship between equine uriniferous eczema and this condition?

Pneumonia and pleurisy following strangles appear to me to be somewhat rare, and it is only occasionally that lesions occur in the pericardium. Sometimes one sees disturbances in the eyes, but I have not checked any recent outbreaks with the ophthalmoscope, although it would seem to be very desirable when opportunities occur. I do not think that I have seen many cases of septicæmia or pyæmia following this disease.

What is the effect of an attack of nasal catarrh upon joints, tendon sheaths, and synovial sacs? I know that many workers have failed to find organisms in these situations in cases which one is inclined to attribute to previous nasal catarrh. I understand that this is also true in the case of the metastatic lesions in joints and synovial sheaths of human beings suffering from acute rheumatism, which is said to be due to a streptococcus. In horses many affections of synovial membranes occur after streptococcal infection, but that does not prove that they are necessarily related. At times, it seems difficult to escape the conviction that the two conditions are closely interwoven. At others the relationship seems remote or to require another factor, such as the interposition of a focus, to wit periodontal disease. I am afraid that there is no satisfactory method of settling this point as there are so many other factors at work.

Whilst many outbreaks of nasal catarrh or strangles pass off without cases of *purpura hæmorrhagica* occurring, it very often happens that there will be three or four animals affected out of, say, 20 to 30 cases. At another time, without apparent previous illness, one is confronted with a definite case of this condition. Nevertheless, it is to my mind difficult to dissociate it from the streptococcus. I know full well that one is supposed to recognise a primary purpura and a secondary one (following strangles, influenza and contagious pneumonia). According to the works of Lignières, Carpano and Zwick, intravenous injections of divers streptococci give rise to purpura.

I should like as many speakers as possible to give their experiences as to the effects of nasal catarrh, etc., upon the *heart*. I have examined many cases during illness and have noted little wrong with the heart, yet after a week or two at work, fatigue is noticed. The results of the examination of the hearts of these cases are most unsatisfactory. They seem to vary so much. Very often the pulse rate is about 50 per minute and irregularly intermittent; for a few moments the beats are more frequent than normal, then there is a short intermission, then a few more beats of diminishing force and decreasing frequency and finally there is a long intermission. The next cycle may consist of the same phases in an altogether different order. On listening to the heart, the second sound is difficult to distinguish from the first, as it is accentuated and the contractions are from time to time tumultuous. I do not know the physical state underlying this picture. Some cases will do slow single work, but anything above this causes them to stop, stand still, and in many cases refuse to move. Great improvement sometimes follows a summer's run at grass, but by the end of winter, rest is again indicated. I have made an examination of a few hearts from these cases but I have not been able to gather much of a very definite nature. It seems to me that the wall of the left ventricle is thickened and that the cavity therefore appears smaller than normal, whilst the right wall is apparently thinner and the cavity a little larger than it should be. I know of no more difficult a task than to assess the correct size of the cavities, of the orifices or the normal thickness of the walls and septa of the heart. Since the last sentence was written, I have read Krause, " Lehrbuch der Sektion der Haustiere," and this contains a very useful table of all the dimensions of the hearts of horses weighing 4½ cwts., 8 cwts. and 14 cwts. It will, I am sure, prove of great service in the future. I took a heart, possessing the characters I have described, to a worker on endocarditis several years ago and he said it would take months to do the abnormal histology and that was all I obtained. An electrocardiagram would appear to be necessary before one can get any further information on this aspect of the subject. Clinically it seems to be cardiac embarrassment, due to the effects of the toxin on the myocardium.

A number of strangles cases, whether of the nasal, pharyngeal, laryngeal, or abscess type, become *whistlers;* many of these will not be noticed unless they are put to fast or severe work or are tested. I have examined many horses either before or soon after purchase and found no trace of whistling, but a month or so after an attack of dealers' cold many are definite whistlers. I am satisfied that some of them cease to whistle after some months. Whether this is due to compensation in the larynx or to the repair of the damage in the left recurrent nerve, I do not know. After a while, some of these whistlers are found to have become bad

roarers and as far as my experience goes, remain in this state. I have notes of an outbreak amongst sixteen light horses. The nasal discharge was slight but pyrexia was marked. They all recovered without abscessation but four became whistlers and four roarers. The latter had to be subjected to the ventricle stripping operation, with the result that two were greatly improved, one was not altered and one became worse. As I had galloped all these before purchase and have tested many of the cart horses alluded to, I have a great distaste for the Horse Breeding Act of 1918 where whistling, roaring and certain other diseases are scheduled as hereditary when they are obviously not always so. Strangles is so common that few young animals escape it and many of them are left with a defective larynx, but that is not an hereditary disease.

I do not know the relationship which exists between these coccal infections and *shivering*, but I am certain that numbers of horses have been examined before purchase and no trace of shivering found, yet soon after an attack or sometimes during the last stages of it, some are discovered to be definite shiverers. I have seen this happen in an animal which I had watched grow up and whose sire and dam I knew to be sound. It is therefore no wonder that shivering leads to so many disputes among the horse-owning fraternity and within our own ranks.

There are many other aspects which will occur to my opener and subsequent speakers. I trust, however, that I have said enough to show the ramifications of strepto- and allied coccoses, to interest you, and to provoke a profitable discussion. I have now seven young horses in my charge, which were purchased about the third week in March this year, five from two dealers, and two from a farm sale, which have not yet had a continuous high temperature. In my experience this is rare, as one would have expected at least half of them to have had a fever temperature.

I should like to close with a quotation from Cadiot, Lesbouyies and Rie's work: "Traité de Médecine des Animaux Domestiques":—

"Plus que tout autre processus infectieux, la gourme est la maladie des surprises, des accidents, des rechutes ou récidives."

References

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[2]Pillers, A. W. Noel. Some Observations on Periodontal Disease in Adult Cart Horses. *Veterinary Record*, Vol. 13, 1933, p. 1404.

[3]Arnold, Major T. F. Strangles. Part I.—Clinical Observations. *Journal of the Royal Army Veterinary Corps*, Vol. 3, No. 2, 1932, pp. 65-74.

[4]Arnold, Major T. F. Strangles. Part II.—Theories and Experiments. *Idem.*, Vol. 3, No. 3, 1932, pp. 109-119.

[5]Arnold, Major T. F. Strangles. Part III.—Principles of Causation and Control. *Idem.*, Vol. 5, No. 1, 1933, p. 6.

[6]Berry, W. G., and Pillers, A. W. Noel. A Rare Skin Lesion of the Horse somewhat resembling Dermatitis erysipelatosa. *Veterinary Record*, Vol. 26, 1913, p. 369.

Discussion

Heartily welcomed on his first visit to the Midland Counties Veterinary Association, Major A. A. Pryer, R.A.V.C., opened the discussion. He remarked that Mr. Pillers had selected as his subject one of the thorniest problems imaginable and raised issues which were encyclopædic. He mentioned this in no sense of disparagement, but as a plea in mitigation if he omitted to refer to more than a few of them. Since the paper bore a clinical title it would be inappropriate to attempt to divert the discussion into bacteriological channels, and yet he found it impossible to frame his remarks without making some reference to that aspect of the question. Major Pryer continued:—

Mr. Pillers appears to incline to the belief that streptococci are the cause of this nasal catarrh-strangles syndrome. I do not: I am a supporter of the virus *cum* organism theory, as he aptly terms it.

With the evidence we have to go on, I prefer to assume that the fundamental cause of dealer's fever and strangles alike is a filtrable virus, comparable, perhaps, to those causing distemper and swine fever. On entering the body of a susceptible animal the virus causes a rise of temperature, depression, etc., but little else. Consequent on lowered resistance produced by the virus we get the clinical picture altered by secondary invaders, staphylococci or streptococci predominating. If staphylococci predominate a catarrh is the chief complication; if streptococci are in the ascendant you get glandular involvement and strangles. I advance this statement on the results of the laboratory examination of several hundred nasal swabs from cases of catarrh and strangles. Where the glands are involved streptococci are rarely absent from such swabs. If the case is one of catarrh, without glandular involvement, they are equally rarely present. I attach importance to this distinction and regard the early laboratory examination of a properly-taken nasal swab as a step which affords valuable enlightenment. It is my experience that febrile nasal catarrh without gland involvement offers a better prognosis and less likelihood of permanent unsoundness arising as a sequel than does strangles proper. However, that is a point on which I anticipate difference of opinion. I put forward the suggestion that whether the patient gets nasal catarrh or whether it gets strangles depends entirely on whether the secondary organisms are staphylococci or streptococci. Mr. Pillers has some faith in injections of anti-streptococcic sera and bacterins. I have been less fortunate with them and consider, in fact, that anti-streptococcic preparations have failed signally in the control of strangles. I do not

think this is to be wondered at. Not only is the difficulty in evoking an immunological response to these organisms well-known, but there are so many different strains of them. The medical profession encounter similar trouble, I believe, in erysipelas, meningitis, puerperal septicæmia, etc.

Mr. Pillers comments, quite rightly, of course, on the fact that complement is necessary for the action of these sera. Is blood transfusion really within the practicable limits of every-day equine therapy? Is it necessary to group the bloods of the donor and the recipient?

Whilst I am of the opinion that we get no help from streptococcal preparations, the use of staphylococcal vaccines for the relief of persistent nasal catarrh, after the febrile stage has passed, gives undeniably good results.

Mr. Pillers says he is not troubled unduly by the persistent case of nasal catarrh. I find it very troublesome indeed, and quite a high proportion of cases continue to discharge profusely for anything up to six weeks. Neither grazing nor feeding from the ground seems really to have any influence on its course, although I employ one or other, as circumstances dictate, because in theory it is the correct thing to do.

Mr. Pillers suggests that routine inhalations may aggravate the discharge. I agree entirely and gave them up a long time ago in favour of a medicated emollient application inside the nostrils, such as he advocates. Inhalations in horse practice are an irrational mimicry of human practice. They may be useful in a bedroom, the temperature of which is carefully regulated, but the change-over from the atmosphere of hot steam to that of the average stable, when the inhalation is taken away, is altogether too sudden and liable thereby to allow the condition to be worsened.

The essayist makes very pertinent reference to the involvement of the guttural pouches and thinks that they are rarely involved in " dealer's cold," but that in strangles the pus which escapes comes from these structures. I wonder! I do not get much chance of making *post-mortem* examinations on these catarrh cases, but of the autopsies performed on horses, old and young, the number in which there was any departure from normal in the guttural pouches may be counted on the fingers of one hand. I think the commoner place for pus to accumulate is in the sinuses of the head, and tenderness over them can often be demonstrated pretty clearly on palpation or percussion. However, that is open to dispute, and it may be that the guttural pouches *are* involved quite commonly in strangles. If so, and unless they are to be left to constitute a septic focus, the rational line of treatment must be to drain them promptly.

In this connection, can Mr. Pillers tell us anything of their exploration with a Gunther's catheter? I have been toying with one for a year past, but its extreme rigidity makes it difficult to pass. A gum elastic modification of it, complete with electric lamp, on the lines of the rhino-laryngoscope, should be possible and useful.

Regarding the suggestion that strangles is non-existent in Ireland, that, as Mr. Pillers shows, is, of course, quite incorrect.

Passing on to the untoward sequelæ of nasal catarrh, I find metastases and complications much less common after staphylococcal catarrh than after strangles. Following the latter, mesenteric strangles and purpura are the usual ones. I think that if you have an acute streptococcic invasion of the body, you simply cannot say where it will stop. Liver, kidneys, testes and skin are all vulnerable, and one must be on the outlook for surprises, mostly of an unfavourable nature.

Mr. Pillers asks about the effect of nasal catarrh on synovial sacs, tendon sheaths, etc. I find metastasis to these structures very rare indeed. I have aspirated three or four bog spavins with histories of strangles, but the aspirated fluid was sterile in each case.

Pneumonia, pleurisy and pericarditis are most likely to be precipitated by initial failure to recognise early febrile symptoms and, as is well known, are particularly prone to follow travel by rail or road whilst the animal is fevered. Less commonly, they flare up later during a protracted case. I am glad Mr. Pillers stressed Professor Penberthy's advice regarding the constant use of the thermometer among newly-joined and newly-purchased horses. It has saved thousands of lives and should never be forgotten.

Regarding purpura, I think there is ample evidence to show that it is due to hæmolytic streptococci. In some cases it certainly does arise, so far as can be seen, as an absolutely primary and independent condition. I have records of an outbreak of 23 cases, arising in aged horses, quite out of contact with strangles, or for that matter catarrh.

Mr. Pillers invites me to give especial consideration to the effects of nasal catarrh upon the heart. I have listened with interest to Mr. Pillers' experiences and, for the sake of comparison, will give my own.

When one thinks of the enormous number of newly-purchased horses which develop catarrh or strangles, and the number over which any subsequent question concerning the heart arises, it forces one to the conclusion that cardiac involvement cannot be a common sequel. That, however, is not to say that it does not occur. It does, and it has most commonly come to my notice, not because they are slow at work, but on account of an irregular appetite. The animal looks normal and usually has performed any light work required of him without giving cause

for complaint, but for spells of two or three days at a time he leaves every feed. If you look at the flank, you may notice a slight spasmodic twitching of the abdominal muscles. I am told that racing people recognise this picture and call it " dropped heart," whatever that may mean. If the animal is cantered, he shows marked dyspnœa in two or three furlongs. On auscultation I do not usually find intermittency, but a rapid forceful beat, almost as pronounced on the right side of the thorax as on the left. The sounds heard by my ear are usually modified from the normal lubb-dupp to those of la-diddy-dupp—in other words, a double first heart sound. Frequently, in spite of the forceful heart beat, the pulse at the jaw is quite small and thready. I find most of these cases recover completely in four to six months if they are walked solidly for three hours daily—an impossible matter to arrange in commercial stables, no doubt, but a procedure which restores tone to heart muscle affected presumably with cloudy swelling, following the febrile attack of catarrh. Grazing does not meet the case nearly as well.

I do not think an electro-cardiagram is going to help much. During the past two years the Germans and Italians have been very busy measuring blood pressures, etc., and I have read many of their reports, but it seems that it is impossible to allow for the factor of excitement caused by applying the apparatus, and the results have not been conclusive or very convincing.

Regarding the *post-mortem* examination of hearts, in the absence of marked structural change, rare in horses, it is often impossible to say whether or not a heart is strictly normal. If a heart weighs 12 lb. or more in any class of horse, one is pretty safe in regarding it as abnormal. Pallor in colour and increase of breadth in the ventricles without corresponding increase in length are also suggestive of myocardial disease, but beyond that I cannot go. I congratulate Mr. Pillers on having found a much-wanted work of reference on the weight and dimensions of this organ.

I note that Mr. Pillers does not give us his opinion as to the exact connection between nasal catarrh and roaring. He tells us, of course, that the latter is a sequel to the former, but I would like his views as to the exact processes involved. Does he accept the view that it is due to the action of a toxin on the left recurrent, or does he advance some other hypothesis?

Lieut.-Colonel Argyle, in the current issue of the *R.A.V.C. Journal*, suggests that it is more likely that it is due to mechanical pressure on the heart and left recurrent from even a patch of exudative pleurisy. Such localised lesions are sometimes beyond the skill of the ablest to detect, but I incline to the belief that roaring is only a sequel of strangles or catarrh when there has been a definite lesion in the thorax.

The principle in the Army is that if there is the slightest suggestion of a chest lesion, perform paracentesis of the thorax at once, and after practising it for 20 years, I am sure it is the right policy and one which prevents many subsequent cases of roaring.

It is my experience that the higher the general run of temperature during an outbreak, the more likely is roaring to follow. Mr. Pillers speaks of light horses which went wrong in the wind after attacks characterised by marked fever, but little nasal catarrh and no abscessation. That clinical picture is very well known to me, and I have always regarded it as belonging to the influenzal group—what the French call the paratyphoid infection—rather than to real strangles or catarrh. In my experience it is the one above all others to be followed by permanent respiratory disability.

I am a little surprised that the word "influenza" has not entered into Mr. Pillers' remarks. The line of demarcation between this malady and catarrhal fever is not always clear-cut.

I would like Mr. Pillers' views as to whether he regards lameness of the osteo-arthritic group, such as spavin and navicular disease, as being likely sequelæ to nasal catarrh.

A last word regarding the likely root cause of all these maladies: Mr. Pillers incriminates the streptococcus every time. What are his views on the opinions of those observers who regard such conditions as shivering and roaring not as consequences of the streptococcal infections of adolescence at all, but as the results of defective nutrition, either during intra-uterine existence or the first few years of life? I will commit myself no further on this point than to say that I think there is enough evidence of this to merit our serious consideration.

I offer to Mr. Pillers my thanks and congratulations. His choice of a subject is always unrivalled. He selects something of the utmost practical importance and yet something about which we really know nothing. I am sure you will approve if I say that the able and enthusiastic way in which he devotes his talents to the elucidation of our problems is an example to all of us. (Applause.)

Colonel G. Rees Mogg said that catarrh in horses was a bugbear in the Army, especially with the big black horses of the Household Cavalry. His view was that it was best for the animals to contract the disease as soon as possible and get it over. For the first few months horses which came from Ireland were useless until they got over the trouble, but he recognised that it was easy in the Army to keep them off work when they were ill. He had not much use for inhalations and medicated treatment. He was a great believer in walking the horses in fine weather, because that kept them fairly fit. According to Mr. Pillers, some horses were roarers after catarrh or strangles, and he (Colonel Rees Mogg) thought that was due to thickening of the crico-thyroid ligament. He must differ from Mr. Pillers' statement that roaring was not hereditary, though it might not be so much so in stallions as in mares.

Major Brennan DeVine observed that Mr. Pillers' paper contained some revolutionary ideas and he could not understand why other people had experiences so different from his own. He bought a lot of horses both in Ireland and in England and got nothing alarming in the way of catarrh or strangles. "Is it," Major DeVine asked, "because we have no inside or surface drains, or drains of any sort, in our stables? Or is it because we use a bedding that absorbs moisture and is cleared out so that no filth is left? Is it because the stables are properly cleansed and disinfected? Possibly that is so." If more attention were paid to cleansing, the infection would not be handed on so much. He had tried vaccines and had given them up. The most satisfactory vaccine was that made on the spot, *i.e.*, an autogenous vaccine. His experience, particularly with light horses, pointed to the fact that whistling and roaring were hereditary. Roaring started, not with something in the chest, but locally in the larynx. It was due to inflammation and to serum thickening up the whole of the lining of the larynx. He himself might be a revolutionary, but whenever he had to deal with an animal affected in the throat he never drenched it, as one effect was to set up pneumonia. Fresh air was the best treatment.

Mr. R. H. H. Over said he did not find permanent whistling after strangles in the same way as after pneumonia. The hereditary element entered into whistling and roaring, but to nothing like the same extent as was the case years ago. That might be because more attention was paid to the character of the animal bred from. He was confident that there were no cases of shivering that were not hereditary.

Mr. E. Brayley Reynolds agreed with Major DeVine as to the deleterious effect of drenching animals affected in the throat or lungs and that fresh air was the best remedy. He had known many cases of lameness associated with strangles. It was astounding at times to find that an animal which was thought to be sound developed shivering.

Mr. J. W. Conchie said he had had considerable trouble with thoroughbred foals, foaled about February, which developed catarrh with glandular swellings that never reached the abscess stage. He had had autogenous vaccines prepared and had ascertained that the organisms found were streptococci, with some other organisms. The opinion obtained from the laboratory was that the infection took place in the intestinal tract through the mouth. In the next year, when they were yearlings, he had similar trouble with the stock, but it did not develop until July or August. He would like to be able to determine the source of infection.

The President (Mr. A. MacKenzie) asked Mr. Pillers two questions: (1) To what cause did he attribute ordinary fever, in which the horse showed a temperature overnight and was all right in the morning; and (2) why did he prefer the emollient application to the inhalation method of treatment?

The Reply

Replying to the discussion, Mr. Pillers said that, as his paper was more or less a clinical one, he had not gone into the questions of the virus-*cum*-organism theory or whether he could distinguish between the staphylococcic or streptococcic forms. His work was generally confined to the stable. It might be that staphylococci were a cause of nasal catarrh and that the streptococci were found in the glands. He had tried Gunther's catheter, but could not make a success of it, as it caused a lot of bleeding. He had also opened some synovial sacs, and his conclusion was that the aspirated fluid was almost sterile. As to the effects of nasal catarrh upon the heart, he had noticed a slight duplication of the first sound, but believed there was a break in it. He agreed that walking was excellent treatment, but it was difficult to follow with a commercial horse as compared with the Army horse. In regard to the connection between roaring and strangles, he purposely avoided the question, because he could not give a definite opinion. It was a fact that whistling and roaring occurred after strangles, but *post-mortem* examinations had failed to show any material in the chest. Something was to be said for the suggestion that severe changes took place in the region of the larynx, and he had seen some sections of the left recurrent nerve in which there were changes. Whistling and roaring were often to be noticed after a very high temperature. He had not used the word "influenza" because he did not like the word, but he knew that without such terms as influenza, rheumatism, eczema and colic, veterinary surgeons could not live. He had had cases of lameness that he attributed to strangles, but he could not say anything in regard to other lameness associated with osteo-arthritic changes. He believed there was some important relationship between shivering and strangles. Not until some further investigation was made could there be definite evidence on the point of heredity. Roaring and whistling were so common after strangles that there was support for the belief that this disease actually produced the condition. If disinfection was not properly carried out infection might occur in the stables. Drenching had been practically given up in his stud: he regarded it as almost a malpractice. The reason for there being fewer whistlers was probably that strangles was less prevalent. In answer to Mr. Conchie, he could suggest nothing in the way of prevention apart from hygienic precautions. The reply to the President's first question was that the cause of the trouble was the absorption of some toxic matter from the alimentary canal and to the second question that an emollient ointment applied round the nostrils would reduce the period of the discharge, or at least not increase it as inhalations did.

On the proposition of the Hon. Secretary, seconded by Major Pryer, Mr. Pillers was thanked for his paper, and a hearty vote of thanks was accorded to the opener of the discussion.

Colonel and Mrs. Rees Mogg afterwards entertained the members at tea at Clifford Manor, when their hospitality was enjoyed by a large number of members and ladies.

H. W. Dawes, *Hon. Secretary.*

An official of the R.S.P.C.A. recently stopped men from putting the Government stamp on cattle at Ashford Market by threatening to prosecute.

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Veterinary Medicine (Chicago) reports that Dr. Thomas M. Rivers, of the Rockefeller Institute for Medical Research, has discovered a way of growing the virus for small-pox vaccine on living cells in a test tube, thus obviating the necessity for the use of calves and the risk of occasional contamination from this source.

From The Veterinarian

SEPTEMBER, 1834

ON BREEDING HORSES

By T. A. KNIGHT, *Esq., of Downton, Herefordshire*

Having introduced, for the use of my tenants, a high-priced stallion, of the breed of the large London dray-horse, I wish to state to agriculturists the grounds upon which I anticipate much advantage from the introduction of so large an animal. He will, I have reason to believe, be, when full grown, not less than 17 hands high, and very compact in form.

I conceive myself to have proved, by many experiments, of a part of which an account was published some years ago in the Philosophical Transactions, that the length of the legs of the offspring of all those animals which nature has intended to accompany their parents in flight, at an early age, is governed wholly by the habits of the female parent. This tribe of animals comprehends the horse, the cow, the sheep, the deer, and many others. If the female parent be of low stature, and descended from a breed of a similar form and size, the length of the legs of the offspring will be short, and will not be increased in length, though they will in strength, by any influence of its male parent, however tall and large that may have been; and the converse of this proposition will be found to be equally true.

The experience of almost every farmer must have taught him that horses with drop shoulders and bodies, and capacious chests, are more capable of bearing hard and long-continued labour than those of which the shoulders, and of course the chest, are shallow, and the legs long; but comparatively few know how rapidly the powers of draught of any animal mechanically decrease with the increasing length of the legs comparatively with the depth of the shoulders and body. If a horse, proportioned as English horses now generally are, be 16 hands high, his fore legs, measured from the elbow-joint, will be about three feet, or nine hands high, and his shoulder about two feet four inches, or seven hands high. If such a horse be able to raise, by means of a cord passed over a pulley, a weight of a thousand pounds, another horse, similar to that in every other respect, except that of having its legs eight inches shorter, would, on account of the mechanical advantage of its form, be able to raise twelve hundred and fifty pounds, or one-fourth more, with considerably less exertion; for his power would increase with the diminished length of his legs, nearly in the same proportion as the power of the weight upon the longer arms of the steelyards is increased by being made to recede from the point of suspension: and if the length of the leg of such horse, comparatively with the depth of the shoulder, were further diminished, its power would increase in an accumulating ratio. The enormous strength of a bull of mature age affords familiar evidence of the truth of these propositions; and I doubt much whether the offspring of a Norwegian pony, and a strong and low draught mare, would not be found capable of drawing a heavier weight up hill to any considerable distance, than the largest horse of the ordinary form and proportion; whilst it would not, probably, exceed two-thirds of its weight, nor require more than two-thirds the quantity of food: and it would possess much more activity, and be much less subject to accidents. And I have good reason to believe that more perfect animals for supplying mankind with food, may generally be obtained by cross-breeding from females of small and male animals of large size, than from any breed of fixed and permanent habits relatively to size.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

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DIARY OF EVENTS

Sept. 24th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4 p.m.

Sept. 26th.—Meeting of the Lancashire Division, N.V.M.A., at Manchester.

Sept. 28th.—Meeting of the Midland Counties Division, N.V.M.A., at Birmingham.

Oct. 1st.—N.V.M.A. Committee Meetings, 2, Verulam Buildings, Gray's Inn, W.C.1.

Oct. 2nd.—N.V.M.A. Council Meeting, Conway Hall, Red Lion Square, W.C.1.

Oct. 3rd.—R.C.V.S. Committee Meetings.

Oct. 4th.—R.C.V.S. Committee Meetings. Victoria Veterinary Benevolent Fund Council Meeting.

Oct. 5th.—R.C.V.S. Committee and Council Meetings.

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PERSONAL

Marriage.—ROSS—TWEED.—On August 29th, at the 2nd Presbyterian Church, Islandmagee, by Rev. Samuel Gilmour, Robert Ferris, son of the late Mr. Robert Thomas Ross and Mrs. Ross, Ballymoney, Islandmagee, to Ella Wallace, daughter of Mr. William Tweed and the late Mrs. Tweed, Boghead, Islandmagee. Mr. J. M. Ingram, M.R.C.V.S., was best man.

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ARMY VETERINARY SERVICE

LONDON GAZETTE—WAR OFFICE—TERRITORIAL ARMY

September 11th.—Maj. H. W. Stevens having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform (July 27th).

September 14th.—Maj. J. Sheffield having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform (September 12th).

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FOOT-AND-MOUTH DISEASE IN GLOUCESTERSHIRE

The existence of foot-and-mouth disease was confirmed on Friday of last week among cattle at Morton, near Thornbury, Gloucestershire. The area subject to movement of animal restrictions lies in the counties of Gloucester, Wilts, Somerset, and Monmouth.

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BRITISH ASSOCIATION MEETING

STUDY OF ANIMAL BEHAVIOUR

Addressing the Section of Zoology at the meeting of the British Association at Aberdeen, Dr. E. S. Russell, the President of the Section, said

that the study of animal behaviour had been somewhat neglected in this country and had been largely divorced from the general study of zoology and handed over to the physiologists and the psychologists, neither of whom, he thought, were usually sufficiently naturalists to appreciate the full biological significance of the behaviour observed in the laboratory. It was obvious that an animal's behaviour was one of the most important things about it, and that a zoologist who wished to understand how an animal lived, maintained itself, and carried on the race, must begin by studying its behaviour in the field.

The physiologist as such could have nothing to do with mind and handed over its study to the psychologist, who found that he could know nothing directly about the minds of animals. "Let us try to rid our minds of the abstract notions of matter and mind, and regard the activities of living things without metaphysical pre-conceptions. As zoologists our job is to study animals in action. Taking this simple and direct view of living things, abandoning theory and accepting the obvious facts at their face value, we see first of all that the complete phenomena of life are shown only by individuals, or organised unities. Sometimes these units are combined loosely or closely in unities of higher order, as in social insects and in colonial animals, such as corals, but these cases hardly affect the main thesis that life is a function of individuals. There is accordingly no such thing as 'living matter,' save as part of an organised unity.

"The second thing we note is that all living things pass through a cycle of activity, which normally comprises development, reproduction, and senescent processes leading to death. This life-cycle is in each species a definite one, passing through a clearly defined trajectory, admitting of little deviation from normality; it takes place generally in an external environment which must be normal for the species, and as a rule the internal environment also is kept constant round a particular norm."

Concluding, Dr. Russell said that the living organism has characteristics which are lacking in inorganic systems, and it can be adequately defined or characterised only by the weaving together in one cyclical process of the master functions of maintenance, development, and reproduction. "These distinguish it from any inorganic object or construction, from any inorganic system. Underlying these characteristics is the general directiveness of its activities, their constant drive towards a normal and specific end or completion."

. . . . . .

In opening a discussion at the joint session of zoologists and psychologists, Professor J. A. Bierens de Haan insisted that there was a subjective element in the behaviour of all animals, even the lowest single-celled creatures, and that behaviour could never be properly interpreted by a summation of physical and chemical stimuli, but must involve spontaneous subjective factors different in degree but not in kind from those of man.

Dr. S. Zuckerman, in a brilliant reply, said that apart from philosophical theories it was clear that subjective interpretation could never establish an accepted body of facts, as no two persons could agree, whereas by proceeding on the analytic and experimental methods of physical science, common truth could be established. He objected to the tacit assumption of many modern animal psychologists that because reflexes conditioned by physical stimuli and instincts could not now explain every pattern of behaviour that there must necessarily be a teleological explanation.

Dr. Rex Knight supported Dr. Zuckerman from the psychological side, and denounced the anecdotal method of collecting data. From a single observation of natural behaviour, or from the results of training, no sufficient inference could be drawn unless reflexes, instincts and previous behaviour were taken into account.

. . . . . .

Meat Preservation

The first of the evening discourses at this year's British Association meeting was a special memorial lecture in honour of the late Sir William Hardy, of the Food Investigation Board, who was elected this year's president of the Association, but died shortly after taking office on January 1st.

The lecturer was Sir Frank Smith, secretary of the Department of Scientific and Industrial Research, on behalf of which Sir William Hardy devoted the last 17 years of his life to research on the transport and storage of foodstuffs. Sir Frank Smith, who made this his topic, said that the developments in food preservation had been lop-sided till Hardy took up food research 17 years ago. On the physical and mechanical sides the development had been rapid, but on the biological side the advance had up till then been slow. It had now been found possible, by cold, to stop completely the self-induced deterioration of meat through enzymes or organisms naturally present in the meat itself, and to stop the development of bacterial infection of the meat sufficiently to keep the meat good as food. Mutton, lamb, and pork were preserved by freezing, but freezing, as distinct from chilling, was unsatisfactory for beef, as the crystals of ice disrupted the muscle fibres, and when the beef was thawed the water was not entirely reabsorbed but drained away and carried with it proteins, salts, and pigments. The solution had been found to be carriage of the beef in an atmosphere containing a concentration of from 10 to 20 per cent. of carbon dioxide gas. Last year under these conditions a commercial cargo of chilled beef was successfully brought for the first time from New Zealand. Rapid developments of this new branch of trade were now being made by the meat and shipping companies.

. . . . . .

Watering of Milk: Dr. Tocher's New Test

At a joint meeting of the Chemistry and Agriculture Sections a discussion was held on the chemistry of milk.

Dr. J. F. Tocher explained that the freezing point of milk was now used to detect the watering of milk and stated that, on the basis of this test, it was claimed that a mixture of five parts of water and 95 parts of any sample of milk could be detected. He proceeded to show the difficulties of making such a claim. In Dr. Tocher's opinion, convictions should not rest on the results of freezing-point determinations. There was no standard for the freezing point of milk and analytical authorities were not yet agreed upon the nearest approach to the freezing point of water which occurred in genuine samples of milk.

Dr. Tocher approached the "watering" problem from two standpoints, the variation in the proportions of the constituents of milk and the variation in the freezing point of milk. His "constituents" test was based on his discovery that where solids-not-fat percentages were high, the proportions of the individual constituents differed from the relevant proportions in the cases

where solids-not-fat percentages were low. Thus rich milk, when watered, would on an average show different proportions of the constituents from those in poor milk. The problem was therefore a problem in probability. Using the results of analyses of 474 samples of milk from individual cows he solved an equation which gave the relationship of the four chief constituents to the total solids other than butter fat. The predicted solids were found to approximate closely to the actual solids in samples from individual cows. When, however, a sample was watered, the predicted values differed significantly from the actual values.

Reverting to the freezing point test, Dr. Tocher said he was grieved to think that judges should be misled by witnesses who failed to recognise their responsibilities and who failed to perceive the gravity of making statements which the accused, if innocent, were not in a position to rebut.

* * * * *

VETERINARIANS INTEREST MEAT TRADERS

In the *Meat Trades Journal* for July 26th, 1934, reports are given of addresses by two members of our profession which have attracted the attention of members of the meat trade.

Professor Share-Jones addressed the delegates attending a meeting of the Lancashire Council of Meat Traders and Mr. L. B. Grace the members and delegates at the Royal Sanitary Institute Health Congress.

Professor Share-Jones dealt with many problems agitating the minds of husbandmen and put forward many intriguing views. He pointed out that the greatest problem before politicians to-day was whether or not Great Britain was a country devoted to animal husbandry or to arable cultivation. It was so recently as 1922 that the Government first attempted to form an estimate of the value of the animal population. They were dependent on other countries for meat, and this called for close examination. Increased prices for commodities such as milk did not result in the producer getting all the benefit unless there was an all-round increase in wages for those who consumed it. He deprecated legislation which created inequality and, as example, referred to the Tuberculosis Order to compensate the farmer and not the butcher and expressed the belief that anything confiscated in the interests of the public should be balanced by adequate compensation. An amendment of the existing law was urgently required so far as it affected the animal industry.

He thought it was for the Government to take charge of the whole industry and provide the means whereby the whole of the animal could be used effectively. He suggested that if this were done there would be opportunity of reviving those many village industries that had now gone out of business, and those who desired to see workers returned to the countryside realised that if they were to achieve their object they must provide work which could be carried out by rural communities. He was not in favour of the abolition of private slaughterhouses and markets for these reasons.*

[*A correspondent comments as follows on this portion of Dr. Share-Jones' observations: "It is difficult to follow his line of argument here, because effectively to deal with the by-products from animal slaughter on an economic basis there must be concentration of slaughter and, moreover, there are the facilities for meat inspection to be considered in the concentration of slaughter."]

The authorities, he continued, were apparently willing to tolerate tuberculous infection in milk by advocating pasteurisation, and the same means of treating meat was not allowed, which showed the chaotic state of affairs.

Reference was made to the great progress Denmark achieved when she forsook arable cultivation and accepted animal husbandry as her natural legacy. Denmark's climate was similar to that of Britain, and climate and soil constitution decided what a country's agriculture should be. England's soil and climate were the best in the world for the production of animals, and they did produce the best in the world; it was a question of directing England's agriculture in the most desirable channels.

Mr. Grace's statements were discussed in the weekly talk of the trade and, as might be expected, the members of the meat trade attach great importance to any interference in their methods which must necessarily occur if and when the centralisation of slaughter and better inspection of meat take place.

* * * * *

ERRATUM

September 15th issue, page 1134, first column, line 30: 1890 should read 1880.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

* * * * *

AN INCIDENT AT THE CONGRESS

To the Editor of The Veterinary Record

Sir,—Now that the full reports of the "ruling out of order" episode at the Congress have appeared, may I have the courtesy of your columns to make my personal explanation, Mr. Noel Pillers having made his at a meeting of Council?

At the discussion of Major Douglas's paper on "The Eradication of Tuberculosis," after Mr. Male had spoken, Mr. Pillers, as Chairman said, ". . . . I shall not allow any discussion whatever of divisions of the Veterinary Profession. We are discussing the eradication of tuberculosis by the Veterinary Profession as one profession, and I must ask you to keep to that point." I protested against that ruling on the grounds that it prohibited discussion of a very important feature of the Cattle Diseases Report, namely, the proposal that eradication should be effected exclusively by one division of the profession. Mr. Steele Bodger also registered "his very emphatic protest against the Chairman's ruling." Neither Mr. Steele Bodger nor I challenged the Chairman's authority. We merely protested against his ruling, a perfectly legitimate and orderly procedure, nor did we say that he had entirely ruled out discussion of the Report. Both at the morning meeting and at the Annual General Meeting in the afternoon, I made it quite clear that my protest had to do with his having disallowed any discussion of one particular aspect of the Report only.

There is no need to stress the importance of this provision which we were forbidden to discuss. It affects every one of us. It cuts across the very structure of our profession and it is no disparagement of Major Douglas's paper when I venture the opinion that the vast attendance at the meeting was due to the widespread desire

to hear all about the Economic Advisory Committee's Report. Major Douglas and Mr. Male both said that they had been asked to deal with the Report at that meeting. If the President and the Provisional Committee had wished to have any particular part of it excluded from discussion they would have said so. Did they do that? To discuss eradication as propounded by the Economic Advisory Committee without discussing how it was to be achieved would be a farce. It may be taken, I submit, that all the Committee's proposals, so far as they concerned eradication of tuberculosis, were intended by the President and Provisional Committee to come under the survey of that meeting, but Mr. Pillers' ruling prevented that. And it was the only opportunity that the Congress gave for it.

May I make one slight correction of your report of the proceedings? In your Congress number, p. 966, I am reported as having said, addressing the President, "I am not convinced by the argument behind your statement, Sir, but, I accept what you have to say, quite unreservedly." I was not really guilty of that rather contradictory remark. What I did say was, "I am not convinced by the argument *from behind me* (*i.e.*, from the gentleman sitting behind me), but I accept, etc." The gentleman behind me as I learn from your report, was Professor Boddie, who said, "Surely the fact that the meeting this morning fell in with the Chairman's ruling answers all these points." Oh, Professor Boddie, surely not! Is that not just what anyone would expect of a gathering of average decent citizens?

I do hope, Sir, that no one will point out that the Council confirmed the Chairman's ruling, and that that answers all my contentions. It just doesn't.

I am,
Yours faithfully,
DONALD CAMPBELL.

Rutherglen.
September 15th, 1934.

THE DOUBLE INTRADERMAL TUBERCULIN TEST

TO THE EDITOR OF THE VETERINARY RECORD

Sir,—In reply to Mr. Coleman *re* my criticism of the double intradermal tuberculin test, in my original article I gave a full description of measurements and of the swellings, which, for some unknown reason, were omitted; these were as follows:—

JULY, 1934, TEST

Name	1st Measurement	2nd Measurement	Condition of swelling, 48 hrs.	3rd Measurement	Condition of swelling, 72 hrs.
Crimson Rambler	6	12	Painful and Diffuse	30	Painful and Diffuse
Mavourneen	5	9	,,	16	,,
Froyz Trinket	7	16	Painful	22	Painful and slightly diffuse

SAME COWS, DECEMBER, 1933

Crimson Rambler	7	9	Painless and Circumscribed	11	Painless and Circumscribed
Mavourneen	6	8	,,	10	,,
Froyz Trinket	6	9	,,	10	,,

I am quite willing to admit that my reading of the reactions in this test appear to be inaccurate, but I am sure that the Ministry of Health would not have allowed the cows to remain in a T.-T. herd, and consequently I maintain that the test is not fool-proof and should be improved if possible.

Yours faithfully,
W. WATERS.

38, Head Street,
Halstead, Essex.
September 12th, 1934.

Diseases of Animals Acts.

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16th to 31st August, 1934	17	28	3	361	5	6	33	44	28
Corresponding period in									
1933	8	8	4	690	7	7	15	46	30
1932	5	6	—	—	3	3	18	27	13
1931	19	25	11	1,432	2	2	12	65	40
Total 1st January to 31st August, 1934	264	301	5	454	98	160	408	1,079	671
Corresponding period in									
1933	192	218	62	6,049	109	185	240	1,016	619
1932	251	309	6	562	99	159	164	1,207	598
1931	338	380	90	9,910	106	173	207	1,314	551

NOTE.—The figures for the current year are approximate only. § Excluding outbreaks in Army Horses.

SEPTEMBER 29TH, 1934.

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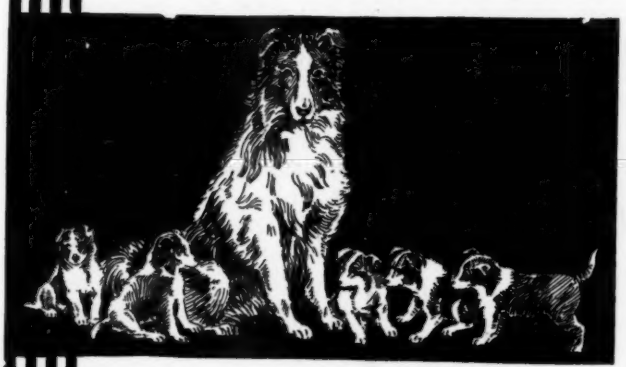

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